Académie Royale de Belgique

Classe des Sciences & Classe Technologie et Société

Response to the consultation launched by the European Commission following the publication of its Green Paper:

From Challenges to Opportunities: Towards a Common Strategic Framework for EU Research and Innovation funding

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Management Summary

Introduction

The European Commission has published a Green Paper entitled « From Challenges to Opportunities: Towards a Common Strategic Framework for EU Research and Innovation funding ». The EC invited all stakeholders to debate about the ideas contained in the Green Paper and, specifically, to answer 27 questions about various aspects of a future Common Strategic Framework for EU Research and Innovation.

The « Académie Royale de Belgique », and specifically its « Science » and « Technology and Society » classes, hereinafter referred to as « the Academy », convinced of the importance of the European Union role in supporting research and innovation in Europe, has decided to compile a common response to the Green Paper.

A detailed answer to most of the 27 questions listed in the Green Paper is found in the following pages. It often echoes viewpoints already expressed in an earlier report published in June 2010 by the Academy under the title *« The de-industrialization of Europe. There's no more time to lose ! »*.

The Academy's main conclusions and recommendations are provided in the next section.

Main conclusions and recommendations

1. The Academy supports the goal of the European Commission to better support all phases of the « Full Innovation Cycle ».
2. The Academy strongly reaffirms that basic research is an essential component of the cycle which should be duly funded. Its specific characters should be recognized and valued: curiosity driven, open-ended, not initially motivated by a specific application.
    a. The ERC is an important mechanism for funding basic research; the budget made available to this part of the CFP should definitely be increased.
    b. Support to the large research infrastructures should be reaffirmed and stabilized, following the recommendations of the European Strategy Forum on Research Infrastructures (ESFRI).
3. Innovation currently receives a limited funding from the Competitiveness and Innovation programme but mainly gets supported by other directorates-general, each acting to support innovation in its own field (energy, transport ...). The future CSF should therefore:
    a. have increased financial means as compared to the previous framework programme to efficiently support basic research, applied research and innovation;
    b. have the power to coordinate, align, leverage, unify the innovation funding policies of other directorate-general.
    c. As such, the CSF should become a truly transversal programme cutting across all European Commissions divisions.

4. European research funds represent a small fraction of the overall R&D spending in the European Union. As such, its main role is to structure the European research area and to help create and maintain a spirit of transnational, pan-European research partnership. The CSF could go one step further in creating the ERA by introducing the highest possible level of coordination and cooperation among the Member States programmes funding research and innovation.

5. The European Commission should also keep on encouraging all member states to reach their goals as stated in the Europe 2020 agenda and specifically to achieve the target of investing 3% of GDP in R&D in particular by improving the conditions for R&D investment by the private sector.

6. The estrangement of society with science and technology is a primary concern for the Academy which would like the CFP to tackle the all-important challenge of:

    a. reconciling students with science and technology studies;

    b. re-instating a climate of confidence between science and society through dialogue, information and mutual respect.

7. The Academy also supports the goal expressed in the Green Paper to motivate more stakeholders to participate to European research programmes. This requires a number of important evolutions and perhaps, altogether, a cultural revolution:

    a. A radical simplification and unification of the management practices at all stages is requested by all stakeholders.

    b. All steps of a project's lifecycle (proposal submission, contract negotiation, project management, financial and technical reporting) are considered as unnecessarily complex, long, costly, unclear, uncertain and, at times, vexing.

    c. The very low proposal success rate, associated with an unsatisfactory evaluation process, is a huge deterrent for newcomers with the result that only very experienced partners, highly skilled at writing attractive proposals, may take the financial risk of entering a research partnership. The cost of a failed proposal is indeed enormous for the proposers and for the EC services.

    d. The length of the preparation, evaluation and negotiation process and the random nature of its outcome lead most stakeholders to consider that truly strategic research cannot and should not be conducted at EC level.

    e. The EC must, in terms of project management, evolve from a culture of control to a culture of trust. Nitty-gritty financial regulations, purely formal technical project assessments, late payments, endless contract negotiation are indeed part of every stakeholder's experience in running EC projects. One contributor to this report said « I wonder if the EC knows the unbelievably high cost of every € we get ! ».

1. Question 1

How should the Common Strategic Framework make EU research and innovation funding more attractive and easy to access for participants? What is needed in addition to a single entry point with common IT tools, a one stop shop for support, a streamlined set of funding instruments covering the full innovation chain and further steps towards administrative simplification?

A single entry point with common IT tools is a welcome evolution that should simplify all aspects of the participation to Framework Programmes. The IT tool, building on the success and learning from the deficiencies of the EPSS (Electronic Proposal Submission System) and Participant Portal, should provide all stakeholders with a single entry point for:

- obtaining information on rules for participation, content and schedule of open and future calls (in a more orderly manner than in the current CORDIS maze);
- registering new potential participants to the URF (Unique Registration Facility), checking PIC (Participant Identification Code), modifying or adding LEAR (Legal Entity Appointed Representatives);
- submitting new ideas and identifying potential partners with whom proposals could be built;
- submitting proposal electronically and checking eligibility on-line;
- checking the current status of a proposal;
- negotiating the grant agreement with the Commission;
- managing all aspects of the project's administration: reporting, deliverables, financial aspects, ...

NCP (National Contact Points) already provide one stop shops for support; their funding, based on the definition of clear targets, should be ensured for the whole duration of the next Framework Programme or CSF.

All actors agree that a streamlined set of funding instruments covering the full innovation chain is required. Nevertheless, the balance between support provided at various stages should be carefully assessed. Curiosity-driven research requires a higher funding rate than goal-driven research which, itself, requires a higher funding rate than innovation. There is also a fear that, by covering more phases of the research and innovation process, the already scarce European resources will be spread too thinly on too many actions. Adding together the 3.6 billion euros budget of the CIP (Competitiveness and Innovation FP) to the 53.3 billion euros budget of FP7 will not be sufficient to support the ambitious objectives of a future Common Strategic Framework. This point will be discussed again in the answer to several other questions.

Further steps towards administrative simplification may indeed certainly be taken and we support those that the Commission services are proposing. Globally we would like the system to evolve towards:

- a lower administrative burden for the project's coordinator;
- a less « nitty-gritty » control of costs, which is mainly due to the sometimes inane requirements of the European Court of Auditors or of the legal department of the Budget directorate-general, would be more than welcome;
- the system of independent audit is a good system and should be generalized: basically, the EC should accept all costs validated by a legally appointed national auditor;
- a more consistent, less formal, assessment of the quality of the research work, could perhaps be achieved through the systematic reliance on peer reviewing;

- a project should indeed be assessed on the quality of the work performed, not on the timeliness and accuracy of (sometimes useless) forms;
- the request for more freedom and less control stems for a higher responsibility for partners and consortia: the Commission should perhaps consider setting up new rules that would financially encourage high quality, high innovation research and would penalize low performers (mix of input- and output-based funding).

But, more globally, how should the Common Strategic Framework make EU research and innovation funding more attractive and easy to access for participants ? Some suggestions are given in the following sections.

- **Suggestions related to funding**

Current funding rates for industry and SME are at the right level even if the system of flat overhead rate could be generalized.

Funding of universities, based on marginal costs, is attractive for the research team ... but not for the institution itself. A reasonable level of overhead should be funded and should be directly allocated to the institution and not to the research team.

Regular advance payments should ensure that the cash position of all participants is always positive. This is not, and by far, the case in all projects. This is a major problem, and sometimes an obstacle to participation, for SME and universities.

- **Suggestions related to the organization of call for proposals:**

All potential participants should have a complete visibility on the calendar of open and future call for proposals. Ideally, a schedule of future calls should be defined for the complete duration of the framework programme and changes to the schedule should be duly publicized.

The possibility to have open calls (no fixed submission deadlines) with six-monthly evaluations should be considered.

There should be more transparency in the procedure followed to define topics retained for a given call and calls targeting a too specific or narrow topic should be avoided.

- **Suggestions related to evaluations and success rate**

At EU level, fewer than 20% of applications for project financing get accepted. Given such poor chances of success and the heavy workload involved in complying with all of the formalities, some potential applicants of great merit simply give up. There are now companies specialized in the « coaching » of those who compile project funding applications because form sometimes prevails over substance. Using the « right » key words is vital and only the very practiced can satisfy sometimes implicit requirements. **It is highly regrettable to see funds earmarked for research diverted to fund communication agencies !**

Should a group of people nevertheless decide to invest the time and money necessary in drafting a project, it is to be feared that the judgment rendered by the 'experts' will be neither judicious nor indeed fair. This problem has become very widespread in scientific circles and is not specific to the Commission. This is felt all the more acutely when considerable amounts of time and money have been spent preparing the project.

Different mechanisms should be considered for reducing the time invested in vain in an unsuccessful proposal:

- Revive the FP5 Exploratory Awards mechanism which gave limited funding to SME in order to explore the possibility of setting up a consortium and putting a project proposal together.
- Give proposers access to self-assessment tools (on-line check of eligibility criteria, on-line confidential assessment of the proposal draft by partners and external experts the partnership would solicit). The idea is to get valuable feedback on the proposal

and to identify early on in the proposal preparation process the shortcomings of the proposal.

- Several programmes have, over past FP, used a two-step evaluation process where only the highest quality short proposals, submitted and evaluated in a first phase, are invited to submit a full proposal in a second phase. This process very much reduces the cost of preparing a proposal and is an important incentive for inexperienced organizations to launch the process of putting a proposal together.
- A very regrettable case is when two high quality teams are proposing two high quality proposals but only one of them can be funded while a mix of both proposals could have been ideal. This happens much less in very organized sectors like the aerospace industry where a coordinating body qualifies (labels) proposals and ensures a minimum level of coordination. Such (democratic) pre-submission coordination should be encouraged.
- The evaluation process, and, specifically, the hiring of evaluation experts, should be thoroughly reviewed and modified.

- **Suggestions related to the negotiation of grant agreements**

The overall delay between the opening of a call for proposal and the start of a successful project is far too long and the success rate too low. This leads many companies to the unfortunate conclusion that European funding should not be sought for pursuing truly strategic ideas. To counter this, the total delay between the call closing and the start of the first successful projects should be reduced to 6 month at most.

- **Suggestions related to the execution of the project**

A project's work programme (and the associated list of deliverables and milestones) is too rigid and changing it is often an administrative nightmare. This inflexibility is not compatible with the spirit of research and innovation which requires a constant redefinition of the strategy on the basis of new results. The EC services should demonstrate more flexibility in the technical management of the project and remain closer to the spirit rather than the letter of the work programme: getting results following a different approach than in the proposal should definitely be allowed. This additional flexibility is also likely to attract more participants.

The project officer often lacks the knowledge and experience required to give valuable feedback to the consortium. The use of two external advisers should become systematic and would give the EC a better, more accurate view on the state of the project and would give the project valuable input.

Some requirements (public web site, technology implementation plan, final public report, dissemination event) are important and should be part of all projects but ... partners sometimes have the feeling the EU is only interested in these aspects which are, on all accounts, ancillary to the research action itself.

- **Suggestions related to attracting new partners:**

Incentives should be defined to encourage the admission of new partners. Partnerships indeed appear to be, more often than not, a club of old friends that have been working together on similar subjects throughout past FP. Old and perennial partnerships have benefits and should not be discouraged but the inclusion of new partners should definitely be encouraged, perhaps by

- a higher funding rate for a first participation or
- by a fixed additional flat project coordination budget for each partners who is participating for the first time ?

Open partnerships should also be encouraged. Adding one or more new partners after the project is launched should be made easier. It is indeed often discovered, after the beginning of the research work, that a specific skill is missing to the consortium. It is perhaps at this stage that partners with no previous experience in EC programmes could most easily be integrated.

- **General suggestions:**

Overall, in order to promote a wider participation, the keywords should become:

Clarity, transparency, consistency, efficiency.

Less control, more trust, more responsibility.

2. Question 2

How should EU funding best cover the full innovation cycle from research to market uptake?

By « full innovation cycle » we understand that the CSF wants to cover three broad domains:

- « basic » or « curiosity driven » or « upstream driven » research with no pre-conceived exploitation direction;
- « applied » or « application driven » or « downstream driven » research targeted at well defined needs and where the exploitation potential, though uncertain, is an essential element of the research;
- « innovation » support aims at increasing the TRL (technology readiness level) of relevant applied research results and to let them cross the chasm that separates research results from their application in marketable products or services.

The new Common Strategic Framework (CSF) should support, in a balanced way, all three areas.

■ **Upstream or curiosity driven research**

Criteria here should be simple and limited to:

- scientific merit of the project;
- quality of the research groups involved (the quality of partners being as important as the apparent originality of the project);
- cohesion of the applicant group, attested to if possible by joint publications or researchers' exchanges prior to the request for funding.

Large-scale financing should be guaranteed for five years, with only one interim financial report to keep the administrative burden to a minimum, but with annual progress reports to be scrutinized by competent experts.

To the three criteria mentioned, one could add the anticipated medium- or long- term outcomes. Too much emphasis must not, however, be placed on these given that immediately foreseeable developments or applications do not generally ensue from truly original research.

Basic, or fundamental, research sometimes falls within a pre-defined strategic framework. For example, the discovery of so-called high temperature superconductors - awarded a Nobel Prize in physics - was made by teams doing basic research to find new materials endowed with original conductivity properties. One could qualify such research as 'strategic', seeing as how it is centred within a continuum embracing 'absolutely' free and basic research, e.g. into the Brout-Englert-Higgs boson, and oriented research entirely driven by the downstream and founded on the (established) achievements of free research and strategic research.

The European Research Council (ERC) was set up to support free research in Europe. It enabled not only talented researchers having decided to pursue their careers on other continents to return to Europe, but also others not to leave in the first place.

The financial resources allocated to the ERC are inadequate and grant requests fully substantiated scientifically have had to be turned down. The forthcoming discussion on Europe's financial outlook is an opportunity to increase the funding made available to the ERC.

It would be more than regrettable if the economic crisis hitting the EU States curtailed even further the financing of free and strategic research, both of which are the grassroots of future economic and financial prosperity.

■ Downstream or application driven research

The EU Member States and Commission also finance R&D projects whose aims are identified from the outset and are therefore driven by the downstream. Industry is usually best placed to ascertain which discoveries are likely to result in innovative products and/or manufacturing processes, in energy cost or environmental impact reductions, but it does not always have the internal research capabilities to come up with solutions. This is where a bigger boost should be given to cooperation between industries and universities or industries and public/private research centres, and EU Member States and the Commission urged to explore original methods of raising funds while leaving industry to determine the fields in which innovations are desirable and seem achievable.

Once the research topics and projects selected by a committee of experts and the financing agreed, the industry concerned would be responsible for funding the partner university laboratories. The setting up of such partnerships would also qualify them by their legal status to receive public funding and to then hold industrial property rights upon completion of their works. The whole issue of industrial property should be delved into to avoid litigation but, generally speaking, companies, universities and research bodies are more than experienced in such matters.

In the case of topic-based research, it is likely that results will be obtained faster than with free research. Three to four years is a reasonable time frame to ascertain the likelihood of success of a project whose aim has been identified from the outset. The EU Commission embarked on an approach of this kind with the launch of the « Joint Technology Initiatives (JTI) » and public-private partnerships (PPP) initiated at the end of 2008.

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The « full innovation cycle », in the framework of applied or industrial research, should be in fact seen as a matrix:

- on the on hand, it should cover the different phase of research: ideas emissions, solution design, applied R&D up to prototype then to first test production, industrialization/commercialization. The applied R&D phases have to include prototypes and demonstrators, which generally require much more investment than previous phases.
- on the other hand, it should cover the whole supply chain of production with: materials & products, engineering, process control, system integration, manufacturing & assembling , commercialization, reuse.

■ Financing innovation

Once the aims of research driven by the downstream achieved, and prior to actual industrial production go-ahead, there is usually one phase still to be completed, i.e. the installation of a pilot or demonstration unit to gauge the industrial feasibility or user/consumer interest in a product. This critical stage is often costlier than the research preceding it, frequently requiring high material investment expenditure, with considerable associated risk. It is for this reason that, without public aid from the EU and its Member States, industry often has difficulty in taking the decisions called for. In the best of cases, this ‘point of hesitation’ causes great delay and, in the worst of cases, abandonment of the project, hence the need for account to be taken of this decisive phase in programmes aimed at halting the de-industrialization of Europe. Public backing to limit part of the industrial risk would be necessary at this juncture, e.g. in the form of a recoverable advance payment in the event of success, with grants under such a scheme being made as of commencement of the pilot or demonstration phase.

It must be borne in mind that the location of a pilot or demonstration unit is not without its influence on the subsequent ‘siting’ of production plants in the case of multi-national corporations.

- **Some important remarks**

The separation between the three types of research is somewhat artificial. An ambitious project could potentially include different tasks falling in any of the three categories. Important synergies could come from the exchange of information and experience among partners working on issues with different maturity levels. The CSF should demonstrate flexibility in supporting initiatives that cross the frontiers between the different categories.

Even if they are sequential, though sometimes separated by long pauses, the articulation between all three research phases is an important aspect and bridges should be built between them: an integrated CSF should indeed provide some continuity in the funding of good research results as they evolve, over the years, from the unplanned outcome of a basic research to a marketable innovation[1]. At the same time, funding should be available for innovations entering the cycle at any stage.

In order to efficiently support the full innovation cycle, the new CSF will:

- need to dispose of higher budget; it would indeed not be wise to spread the already scarce resources allocated to research[2] on a wider set of actions (research & innovation);
- have to become a truly transversal instrument, federating and coordinating the actions and budgets of many Directorates including, e.g., Research & Innovation, Enterprise, Environment, Climate Change, Transport, ICT, Education & training, Agriculture, Health which are all, in different ways and at different levels, supporting innovation.

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1 It must be stressed once again that a potential application is always a welcome outcome of a basic research project but should never become its aim; basic research projects should not be assessed on the basis of their likely applicability but on their pure scientific value.

2 As compared to the resources devoted to research by member states through their own national programmes.

3. Question 3

What are the characteristics of EU funding that maximise the benefit of acting at the EU level?

Overall, the most important benefit of acting at EU level is the creation of networks among all actors of the innovation cycle (scientists, research teams, educational institutions, industry and SME).

For basic research, the possibility to have access to expensive and rare research infrastructures is a most valuable aspect.

For industrial research and innovation, PPP[3] have shown to encourage the private sector to invest in technologies related to societal challenges. JTI have been a first attempt at using PPP in a research framework; they have not fully reached their goal, among other reasons because the EU has imposed a heavy, FP7-like, management procedure and has created stiffness where flexibility was expected. But PPP should not be abandoned as they are recognized instruments to leverage public and private funding, to promote Research & Innovation in time to market, to provide coherence between regional, national and European levels, and to create synergies between research actors.

Should there be a strong emphasis on leveraging other sources of funding?

Leveraging other sources of funding or, more globally, creating the possibility to fund an action through multiple sources is definitely an important aspect of a successful, integrated CSF.

Some comments and remarks:

- Leveraging other sources of funding should be made possible and may be encouraged but should not become compulsory in any way. Fund-raising, especially for basic research, is already difficult enough.
- European Calls supplementing national initiatives focusing on societal challenges are expected to have a very large impact.
- FP7, CIT and EIT are not the only European funds available. The Erasmus Mundus and LIFE+ programs or the European Social Fund and European Regional Development Funds are good examples of European funding mechanisms that could complement more usual research funds. This shows the need to have a real transversal CSF programme involving all relevant European Directorates and to be able to mix different funds to support different aspects of an ambitious project.
- Funding is nowadays often complemented or replaced by tax credit. This should be taken into account if we wish to obtain a global view on research funding.

Combining two or more sources of funding for a given project should not mean that the project has to abide by two conflicting sets of administrative and financial rules. If two financing bodies agree to cooperate in the support of one initiative, they should also agree on a unified set of rules or the minor partner should accept the rules imposed by the major partner.

[3] Public Private Partnership.

4. Question 4

How should EU research and innovation funding best be used to pool Member States resources? How should Joint Programming Initiatives between groups of Member States be supported?

EU research funds represent only a small fraction of the overall European research spending; as such, their main aim is of a structuring nature: create a European Research Area by nurturing a perennial culture of cross-border, Europe-wide scientific collaborations.

What is true for individual researchers and research teams may also be true of Member States programmes. EU Research and Innovation funding could indeed be used to fund coordination and information sharing mechanisms between actions funded at national or regional levels. As many member states have embarked in a « clustering » policy, a good example of this would be the « clustering of clusters » via EC funds[4].

Some remarks:

- Coordination of national bottom-up approaches through ERA-Net-like programs has to be further encouraged and strengthened by adding resources to the common approach. Adding complexity to the national rules should nevertheless be avoided.
- The same applies to EUREKA projects. The fact that this collaboration framework is never cited in the Green Paper should not mean that it is not considered as complementary to the CSF.
- Initiatives like PPP and the SET-Plan[5], which are top-down approaches, are good examples of the federation of Member States programmes and funds with the EU research work programme.

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4 The CIP is already supporting the internationalisation of clusters. This type of networking action should be expanded.

5 Strategic Energy Technology Plan, a plan from the Energy Directorate General.

5. Question 5

What should be the balance between smaller, targeted projects and larger, strategic ones?

Projects of all sizes should be supported but size should not be a criterion in itself; what matters is the adequacy of size (funding- or consortium-wise) with purpose. The quality of the project and the team should remain the leading criteria.

It must be noted also that « size » refers to three different project's dimensions:

- overall budget size;
- consortium size (number of teams);
- average resource (man-month) devoted by each partner.

Too many research projects are characterized by a large overall budget (10 to 50 M€) and large participant number (20 to 80) but by low resources committed by individual partners to the project (from 0.5 to 3 EFT for the project's duration). Smaller consortia (3 to 5 partners) where each team invests the necessary critical mass (5 to 10 EFT) would be, in many cases, much more efficient and productive.

Without at all cost championing a policy of « small is beautiful », it seems evident that gigantism curtails creativity and adaptability and that thought must be given to the optimal size of research groups, which necessarily differs according to the type of research undertaken.

The balance, which has been progressively, across FP6 and FP7, shifted from Level 1 (smaller scale, low TRL) to Level 2 (larger scale, higher TRL) projects should be brought back to its original position, supporting preferentially targeted projects led by smaller consortia. Large, strategic projects are indeed sometimes dominated by large organisations and put too much emphasis on fashionable subjects to the detriment of diversity and imagination.

6. Question 6

How could the Commission ensure the balance between a unique set of rules allowing for radical simplification and the necessity to keep a certain degree of flexibility and diversity to achieve objectives of different instruments, and respond to the needs of different beneficiaries, in particular SMEs?

Converging towards a unified set of rules for all sections of the CSF would be a major and welcome achievement. Simplifying, clarifying and streamlining theses rules should be another main aim. If unification and simplification are carried in parallel, unification will not be an obstacle to flexibility and diversity.

Rules governing the execution of projects are one thing; rules defining how proposals are assessed are quite something else. In order to accommodate all type of projects and all type of partnerships, a common set of criteria could be used but with different weighting factors.

7. Question 7

What should be the measures of success for EU research and innovation funding? Which performance indicators could be used?

The success of EU research and innovation funding will be determined by its effect on:

- the structuring of the ERA i.e. in the creation of lasting and productive partnerships at European level;
- the production of knowledge in EC funded curiosity-driven research (publications);
- the production of potentially exploitable results by EC funded application driven research (publications and patents);
- the launch of new products or services as a result of an EC supported innovation initiative.

The latter three indicators can only be compiled if the results of each project remain tracked for several years after the project's completion. This could be achieved via two mechanisms:

- the allocation of a residual funding to the project coordinator for covering the costs he would incur in staying in touch with all consortium members for a number of years after the project's completion and in tracking and documenting the outcome of the project;
- by making part of the project's funding « output dependent » i.e. by providing a « bonus » to projects participants when they report a valuable outcome of their project.

The « ex-post » assessment of past framework programme has not delivered very relevant information because too many different methodologies were used by too many teams funded by uncoordinated « coordination and support actions ». A coordinated and continuous effort to track main EC funded projects' achievements and to identify and publicize best- and worst-practices should be put in place.

8. Question 8

How should EU research and innovation funding relate to regional and national funding? How should this funding complement funds from the future Cohesion policy, designed to help the less developed regions of the EU, and the rural development programmes?

EU research and innovation funding should help articulate, connect and structure regionally and nationally funded programmes.

The Commission should also put pressure on the Member States to set research and innovation as a major political priority and to allocate increased funds for this priority, in accordance with the Lisbon objectives.

The ERA-NET and EUREKA schemes should be further developed, but without adding complexity, micromanagement practices or suspicious audits.

Funds from the cohesion policy should remain focused on research and education. New research centres funded by the European Social Fund and European Regional Development Funds should strive to establish the most active collaboration with smaller and older research groups in their region.

Cohesion funds could also be used to stimulate local research actors to join European-wide research initiatives.

9. Question 9

How should a stronger focus on societal challenges affect the balance between curiosity-driven research and agenda-driven activities?

Curiosity-driven research projects should not be required to be aligned with societal challenges. We stress once again the need to allow fundamental research a (mostly) complete freedom. Agenda-driven research indeed bears the risk of being in fact fashion-driven.

In applied research, on the contrary, societal challenges set the agenda and prioritize the problems in need of a solution. To move as quickly as possible towards a solution, regional, national and European funding should be jointly summoned. This means that the EU has a important role to play in defining a common set of priorities among the many challenges facing our society. When it comes to applied research we definitely advocate a more agenda-driven strategy.

Nowadays, a very interesting and innovative proposal which does not fit exactly with a particular call stands no chance of obtaining funding. It will require at least two years of active lobbying for obtaining the inclusion of the relevant theme in a call. To overcome this difficulty of funding valid but atypical projects, a small part of the budget could be allocated to open calls that directly relate to societal challenges but not to a closed list of well identified research theme.

10. Question 10

10. Should there be more room for bottom-up activities?

Yes definitively!

Bottom-up approaches should be encouraged by the EU as they have the greatest potential for generating innovative results. Bottom-up and top-down approaches should nevertheless co-exist in future calls in order to maintain both the politically- and agenda-driven themes.

RFCS (Research Fund for Coal and Steel) is a very good example of a bottom up activity supported by an efficient selection process.

Additionally and as already explained in questions 4 and 8, an additional support of the EU to national or regional initiatives as ERANET, EUREKA, eco-innovation clusters etc. would be an efficient way to increase the bottom-up approach.

Nowadays, a very interesting and innovative proposal which does not fit exactly with a particular call stands no chance of obtaining funding. It will require at least two years of active lobbying for obtaining the inclusion of the relevant theme in a call. To overcome this difficulty of funding valid but atypical projects, a small part of the budget could be allocated to open calls that directly relate to societal challenges but not to a closed list of well identified research theme.

11. Question 11

How should EU research and innovation funding best support policy making and forward-looking activities ?

The EU research and innovation funding might best support policy making and forward-looking activities through the support of :

- pre-standardisation research including methodologies with a strong involvement of the European Joint Research Centre;
- technology platforms to support the process of roadmap creation and the identification of new ideas through brainstorming;
- inter-platform activity and networking;
- systematic emphasis on quality.

12. Question 12

How should the role of the Commission's Joint Research Centre be improved in supporting policy making and addressing societal challenges?

■ **General comments on the JRC**

The JRC provides strong support to the definition and implementation of sectorial EC policies; this role is beneficial to all directorates-general in charge of these policies and it must be maintained, if not reinforced.

Some aspects of the current activities should be further developed:

- reinforce the JRC's role in terms of prospective, as already carried on at the Seville Institute and in other JRC's Institutes, and give the JRC a central role in the matter throughout the Commission;
- contribute actively, if only in regard of its neutrality and the independence of its expertise, to the definition and constant evolution of the Commission's energy policy;
- be tightly involved in the establishment of the new space policy of the European Union;
- examine what place the JRC could occupy in the definition of a European safety policy.

In order to be able to fulfil all tasks that will be entrusted to the JRC, two conditions will have to be satisfied:

- beyond the necessary links with other directorate-general of the Commission, the JRC must also maintain tight connections with other public and private institutions having a similar goal in the different Member States;
- guarantee the quality of the work performed by ensuring the highest level of scientific and technological competence of its personnel and by establishing and maintaining adequate infrastructures to respond to the « challenge of excellence ».

■ **JRC, norms and standards**

The definition of norms and standards is a corollary of any production activity, be it for goods or services. Getting standards accepted at international level can definitely give one player an economic 'edge' over competitors.

Norms and standards play an important role in protecting the environment, as well as production facility personnel, and of course consumers. Yet they have another purpose: serving as a tool, if not a weapon, in the arena of economic rivalry. Getting 'its' norms and standards to take precedence is a sure-fire way for a country or company to capture a sizeable share of the world market even if its product or process is not the best.

Let us not forget that the National Institute of Standards and Technology (NIST), with its staff of thousands, including some 3,000 researchers, engineers and technicians, its annual income in excess of one billion dollars, and of course directly attached to the Department of Commerce, plays a key role in the industrial policy of the USA. The JRC could, at least partially in the fields of S&T where it is competent, to play the role of the US NIST

Norms and standards, in order to fulfil their purpose, have to be adopted and complied with internationally, failing which they become non-tariff barriers to world trade and can distort competition. Being a driving force in the development of new norms and standards is more than ever crucial for the competitiveness of European industry. The recent standard for mobile telephony is one illustration of this.

Robust research into norms and standards is essential, not only for the adoption and promotion of technological innovation but also for intelligent and reasonable application of the precautionary principle.

The authors of this report note with interest that the European Commission recently set up a group of experts to evaluate the European system of standardization and to table recommendations as to its future development. The commitment is that policy proposals will be forthcoming by the end of 2010. The experts have identified various strategic objectives, the first of which being to strengthen the influence of European standardization (CEN, CENELEC, ETSI, forums and consortia) at international level so as to boost competitiveness and support European trade policy.

Determined action on the basis of this expert appraisal must make this a reality in order for Europe to play a leading role in the definition of norms and standards worldwide.

13. Question 13

13. How could EU research and innovation activities attract greater interest and involvement of citizens and civil society?

Dialogue necessary between citizens, policy-makers and heads of industry

As to options now needing to be taken up regarding the basic or targeted research to be financed, it is no longer possible today to ignore or under-estimate public demand to know more about the consequences of basic, strategic and applied research – and especially of those that could lead to industrial innovations. Policy (and political) decisions in matters of science and technology must be founded on dialogue between citizens, public authorities, industrialists and trade unions of the sector concerned, with readiness on all parts to accept such information from scientists and industrialists truly 'qualified' as 'experts'.

These experts must take time to clearly explain the reasons for their choices and the investment and production implications thereof. They cannot look with disdain at objections which they see as unfounded while those they are talking to regard them as important. They need to converse, convince and compromise. Ways must be found to engage in all-round debate founded on objective and verifiable information, especially as public opinion is in some countries more sensitive than in others to subjective arguments, which are often 'hyped-up' by the media.

This can sometimes 'put on the back burner' decisions that should have been taken straightaway on the basis of a rational analysis and clear understanding that deferring, or wavering over, decisions was even riskier than not deciding at all. This applies to many areas besides strategic industrial policy. Sadly, Europe is all too often subject to such dysfunction, and the de-industrialization of the continent stems partly from this European 'dis-ease'.

14. Question 14

How should EU funding best take account of the broad nature of innovation, including non technological innovation, eco-innovation and social innovation?

EU funding should focus on R&D relating to product, process and service development in the broadest possible sense. The higher extent of services in industrial activities must for instance be given appropriate attention. As « products » include more and more « services », the division between « technical » and « non-technical » innovation is partly rendered moot.

Eco-innovation follows the same pattern as other innovation – it is driven by needs and challenges. EU funding could help such innovations surpass thresholds of uncertainty, for instance when issues of functionality or economy are considered.

Social innovation is often an effect of other developments. One viable approach, therefore, is to consider « secondary » effects (for instance the effect of research funding on education and training).

Social sciences should not be excluded from CFP funding. In fact, all projects should or could include a task studying the impact of the considered research on society and supporting the consortium on some non-technical aspects they should take into account while conducting their research (a.o. acceptability of research results by the public, diversity of managerial cultures and practices, difficulties generated by coopetition aspects)..

15. Question 15

How should industrial participation in EU research and innovation programmes be strengthened? How should Joint Technology Initiatives (such as those launched in the current Framework Programme) or different forms of 'public-private partnerships' be supported? What should be the role of European Technology Platforms?

Now is very much the time to identify the industrial sectors of excellence, i.e. those where Europe still has or can quickly gain competitive advantages. The added benefit of this is that they will then be able to attract the advanced or 'state-of-the-art' technologies that 'make the difference'. In the USA, the aerospace and defence industries have long acted as a catalyst for advanced computer technologies and robotics, just as they continue to do today.

When it comes to support for free research or research driven by the downstream, the EU Member States and the Commission should avoid 'sprinkling' financial resources between too many projects.

Free research and targeted research have never before been as subject to fashion or 'fads' as they are today. Anyone submitting a project about materials has a far better chance of success to secure financing if just about every sentence is peppered with the prefix 'nano' or 'organic'. Terms such as 'environmentallyfriendly' or 'climate change' similarly seem to go down very well with national authorities and the EU Commission alike. Yet clear-sightedness is required to recognize that 'nano' or 'organic' projects though they may be, potentially leading to major scientific or technological breakthroughs, they are not necessarily innovating. By the same token, there are many other fields of research that could potentially be instrumental in slowing down Europe's de-industrialization even if they do not contribute, per se, to environment protection or to the reduction of CO2 emissions. Europe has built up outstanding know-how and expertise in areas of technology offering tremendous prospects – provided they are maintained at their level of excellence. Here too, innovation is the key to competitiveness. Just a few examples include the techniques and technology used in manufacturing, building and construction, air and rail transport. This is not to say that there should be no support for projects aimed at finding solutions, albeit partial ones, to the major problems facing the early 21st century world, but researchers should not be left feeling that their endeavours cannot ultimately, or meanwhile, serve any other purpose.

The sole criteria that should be taken account of here are the quality of the originality and potentiality of impact of proposed projects. What is more, once such projects have been identified by a panel of competent experts, adequate funding should then be allocated for a clearly-defined period, with final judgment as to the quality of outcome(s) rendered as rigorously as that having led to acceptance of the project. There is no certainty that this is what is happening today…

One key criterion for steering selection of targeted research projects to be funded could be: in the event of success, will the outcome(s) enable Europe to become or remain world leader in such or such a field, just as it still is, for instance, in the aerospace and nuclear industry?

The technological platforms created for research purposes within the European Area aimed to enhance oriented research and in some industrial sectors concrete results have indeed been achieved. Examples include the adoption of a strategic « horizon 2020 » agenda in aeronautics, the rationalization at European level of some public and private investments, positive initiatives in pharmaceutics, embedded systems, or again fuel cells. When Europe 'gets its act together' there's no denying how effective it is. Its launchers (Ariane) and telecommunications satellites speak for themselves. Europe is unquestionably a leader in these fields despite its financial resources being far inferior to those of NASA. Yet the slowness of decision-taking so typical of

Europe all too often causes it to 'shoot itself in the foot' thereby losing credibility in the eyes of enterprises ready and willing to partake in joint initiatives. The problems encountered with start-up of the Galileo project are a more recent illustration of the difficulty in getting major European projects 'off the ground' and of the organizational and 'implementational' weaknesses of targeted research. It would be erroneous to hold the EU and its Member States entirely responsible for all of the missed opportunities in targeted research and innovation. Industrial sectors have their share of the blame to carry and should make an effort to engage in closer 'precompetitive' collaboration and be more open than they are to new instruments of development such as public/private partnerships (PPPs).

The role that SMES can – and do – play in slowing down the de-industrialization of Europe is not to be under-estimated. In all European countries there exist outstanding examples of innovative small and medium-sized businesses occupying leader positions on very promising technological 'niche' markets.

Scandinavian countries in particular have a plethora of such enterprises. Far too many European SMEs, however, not only do not undertake in-house targeted research but seem unaware of the opportunities cooperation with universities and research centre could offer them.

16. Question 16

How and what types of Small and Medium-sized Enterprises (SME) should be supported at EU level; how should this complement national and regional level schemes? What kind of measures should be taken to decisively facilitate the participation of SMEs in EU research and innovation programmes?

FP7 has set a clear target: 15% of the total funding it provides should be allocated to SME[6]. Even if this target is seldom reached by individual projects the fact that a target exists has undoubtedly led to a wider presence of SME in FP7 projects as compared to previous FP. But setting a quota is not the best policy. Here are some ideas that could lead to a more widespread participation of SME in future calls:

- SME need support in their preparation of a proposal, especially for the first proposal they prepare or the first consortium they join. NCP, by their competence in building proposals and by their regional base, are uniquely suited for helping SME in this process. NCP funding should therefore be continued and secured.
- SME could get 100% funding for their first successful bid as partners in a consortium;
- SME participating to a large project are likely to be involved in a limited number of tasks and to receive a small share of the total financing. Yet, their administrative and financial obligations are the same as those of leading partners. An idea to correct this problem could be to consider minor partners as sub-contractors to their task-leader. The SME would « invoice » the amount of funding to their task leader who would pay them and then include their costs into his own cost statements.
- Specific Support Actions (SSA) aiming at attracting SME from a given industrial field could be funded. This has been done with great success in the FP6 aerospace programme.
- Instead of requiring 15% participation by SME, large partners could be required to subcontract 15% of their R&D budget to SME. More generally, if, say, 8% of the project's funding goes to SME then 7% of the project's budget should be allocated to a subcontracting fund dedicated to SME. This mechanism would, at the same time, increase SME participation (direct and indirect) but also increase the control (by the industrial partner) on the relevance of the work done by SME in projects.
- Projects submitted and coordinated by an SME should get specific attention. Whatever their qualities such projects are (even) more likely than others to be rejected by evaluators. The use of dedicated evaluation panels or of modified criteria could alleviate that negative bias towards SME-led projects.
- The most convenient way for an SME to enter into a research partnership is at the regional level. An increase of the SME participation would naturally result from an increase of the EU support to the coordination of regional and national initiatives (ERA-Net, Eureka, eco-innovation clusters; see questions 4 and 8).

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[6] By SME we mean those that develop truly innovative projects which could benefit the society in general.

17. Question 17

How should open, light and fast implementation schemes (e.g. building on the current FET actions and CIP eco-innovation market replication projects) be designed to allow flexible exploration and commercialisation of novel ideas, in particular by SMEs?

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18. Question 18

How should EU level financial instruments (equity and debt based) be used more extensively?

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19. Question 19

Should new approaches to supporting research and innovation be introduced, in particular through public procurement, including through rules on pre-commercial procurement, and/or inducement prizes?

1. The EU has a unique role to play in the fostering of innovation by including specific requirements in its procurement policy. Simple examples would be the set-up of high thermodynamic efficiency requirements for its buildings or the migration of its fleet of road vehicles towards hybrid powertrain technology.

2. All available financial means should be summoned in order to provide support to research and innovation including the European Investment Bank.

20. Question 20

How should intellectual property rules governing EU funding strike the right balance between competitiveness aspects and the need for access to and dissemination of scientific results?

21. Question 21

How should the role of the European Research Council be strengthened in supporting world class excellence?

ERC should definitely be strengthened and the amount of funds allocated to ERC projects should be increased significantly. ERC projects must be chosen on the basis of excellence or promising excellence and on the basis of innovation potential.

No undue advantages should be given to fashionable subjects.

The quality of referees should be improved: there are too many self-proclaimed experts in the system.

Cooperation should be favoured to competition.

The financial grant entitled Proof of Concept is however providing funds to already financed ERC grant holders and should not be increased as it is given a cautious reception by the scientific community.

22. Question 22

How should EU support assist Member States in building up excellence?

Identify the areas of existing excellence and develop these areas further to gain or maintain a leading position in the world.

Identify research clusters studying promising technologies related to societal challenges and combine them in well-funded centres of excellence.

23. Question 23

How should the role of Marie Curie Actions be strengthened in promoting researcher mobility and developing attractive careers?

Young scientists' careers are boosted by their participation in international exchange programmes; the Marie Curie actions should therefore definitely be maintained and remain open to any field of research.

Full attention should however be devoted to the complex national requirements in terms of pension, social rights and recognition of research time spent abroad. In fact the EU should ideally create a « social status for the European researcher » and impose it on the Member States.

Some Marie Curie actions are characterized by a very high level of administrative complexity. The programme should have researchers' mobility as its only aim and should support any action contributing to that goal. Dividing the Marie Curie programme into too many partitioned actions (ITN, IHF, IAPP ...) is not a good idea. A Marie Curie project should be able to mix all sorts of mobility grants in a consistent whole and should be able to choose, during the execution of the project, the most relevant mechanism for a given researchers. Full flexibility should also be given to the consortium in deciding who goes where, when and for how long; this should not be rigidly defined in the proposal.

Long period abroad are also difficult to reconcile with a family life so that short stay should be also supported.

Additionally, a convergence with the Erasmus Mundus program should be encouraged!

24. Question 24

What actions should be taken at EU level to further strengthen the role of women in science and innovation?

The problem is not so much that female researchers should be more present in European research but that women should be more present in all scientific and technical fields. Young women should for instance be encouraged to take up scientific and technical profession to increase the pool of researchers but one should first fully understand the main reasons of this gender bias.

This being said, some remarks and recommendations can be made:

- Gender issues appear at present explicitly in the request for proposal and in the evaluation. They should be maintained while not considered as a full-stop.
- Give facilities (and financing) for maternity leaves.

25. Question 25

How should research infrastructures (including EU-wide e-Infrastructures) be supported at EU level?

Common European Research infrastructures are absolutely necessary for progressing in many scientific fields. The focus should not only be on the creation of new research infrastructures; one should also take advantage of and invest in existing infrastructures, supporting the creation of European platforms, federating the national facilities.

26. Question 26

How should international cooperation with non-EU countries be supported e.g. in terms of priority areas of strategic interest, instruments, reciprocity (including on IPR aspects) or cooperation with Member States?

The current mechanism which allows partners from non-member states to participate in a European project provided that their country either contributes to the FP budget (Israël, Switzerland) of accepts to fund their share of the work (some common EU-China projects) should be maintained. Special arrangements could be defined to help researcher from less developed countries.

27. Question 27

Which key issues and obstacles concerning the ERA should EU funding instruments seek to overcome, and which should be addressed by other (e.g. legislative) measures?