

## Innovation put to the test of fears and risks *When France and Europe wake up...*

Summary of the report submitted by Messrs. Claude Birraux and Jean-Yves Le Déaut, deputies

### Presentation

What conditions are needed for innovation to take a leading role in today's society? How can lessons be drawn from successful experiences but also from failures, taking account of the specificities of the French system for research and fostering of innovation? Should a new strategy be introduced to make our country more innovative? What policies and tools could enable risk to be better accepted and innovation to be more dynamic?

To answer these questions, wide-ranging study of innovation that would be resistant to fears and risks was carried out. Over one thousand people were surveyed during this study.

Many visits were also made. :

- in the field, **in Lorraine and Haute Savoie**, to measure the innovative research there and observe the work done by businesses, universities, research organisations and also the business clusters. These two visits were the opportunity to organise original meetings with lycée students in sixth year, and **hand out a questionnaire on the inter-generational approach to innovation**, its fears and its risks, of which we will present the results. The lessons we drew from this were also debated in public hearing;s

- abroad, in both industrialised and emerging countries: **in the United States, Germany, Sweden, Belgium, Switzerland, India, China and South Africa.**

These visits abroad had four purposes:

- First, to check that France was still among the world leaders in research;
- secondly, to ensure that our national research priorities are still relevant;
- thirdly, to identify the most interesting good practices that could serve as inspiration for France, first at organisational level, such as structuring the best use of research, and secondly at the level of society, with organisation of the interface between science and the citizens;
- and finally, to address issues that are the subject of particular controversy in our country, be they GM crops or nanotechnologies.

At the same time, five public hearings were organised in the Parliament:

- the first, on April 14 2011, on **the contribution of inter-generational dialogue** ;
- the second, on May 26, on **innovations for tomorrow's society**;
- the third, on October 12, on **tools for an innovative society**;
- the fourth, on October 27, on **the future of the Plateau de Saclay in the south of Paris**;
- the fifth, on November 24, on **international comparisons.**

More in-depth study has begun on the status of doctors and their career options, based on a second questionnaire, which received a warm reception with over a thousand doctors completing it.

## An ambitious, innovative report

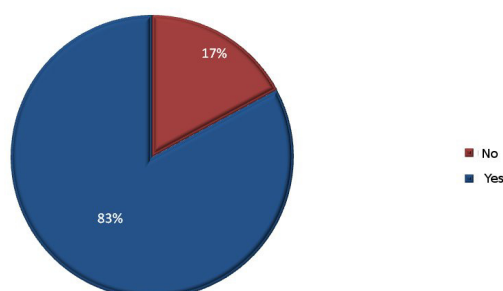
Innovation is indispensable. It is an essential driver of progress, competition, and growth.

However, it should prioritise the citizen if it is to be accepted in a society that fears the risks that will arise, since innovation is change, and change is risky.

To guarantee today's jobs and create tomorrow's, the links between higher education, research, and innovation should be safeguarded and new avenues should be developed to give impetus to industry, not least small and medium sized businesses and industry. Innovation, be it technological, managerial, organisational or social, must become one of France's industrial strengths. Its strategic organisation should be entrusted to the regions. Do you think France has a high potential for innovation?

On the basis of these results, what can be done? We should take our inspiration from the examples that have proved their efficacy. We must take deliberate action at both national and European levels.

Do you think France has a high potential for innovation?



Our visits abroad enabled us to observe several experiments that could serve as inspiration: universities can have completely different missions.

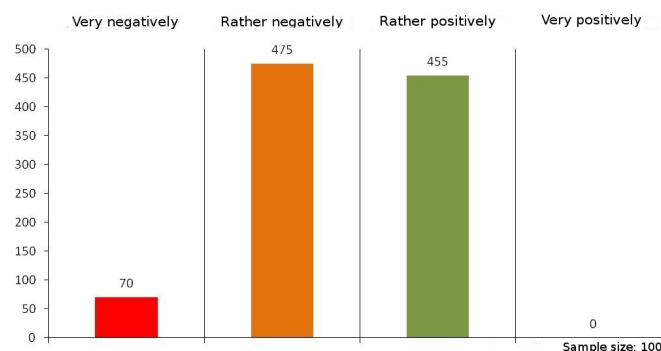
As in Belgium, they can develop a new function of enhancement that becomes a service to society. This new concept may seem a minor change, but in reality it is an important semantic shift that is almost a change of paradigm. Here, the university, more precisely its role of making good use of research, is no longer seen merely in terms of economic impact, but in terms of its relationship with its environment and the citizens. Thus, while research should indeed generate value, that value should also meet the needs expressed by society, and the university should ensure that the citizen has a place in the innovation process.

At national level, this could take the form of educational actions, interacting with the citizens to restore confidence, accompanying innovation, enhancing the results of research, taxation, funding the national research policy, and implementing the principle of precaution.

Our educational system should once more give top priority to instilling in students a taste for science, experimenting and abstraction. Determined action must be taken at all levels. One way to improve the citizen's trust in science and scientists is to change people's view of the university doctorate.

The success of the OPECST questionnaire on this subject reveals the importance of a new approach towards doctorates, in an international climate where recognition of doctorates is more and more important for people wishing to work in pluri-national teams and join international networks. According to the fellows and doctoral students who filled in the questionnaire, France has high potential in the field of innovation which is not fostered enough. As a result, innovation is considered to be less dynamic in France than abroad.

How do you rate France's prospects in international competition?



It is becoming more and more of a handicap for a country to refuse certain types of research at national level. There can only be a short-term approach. Research - such as that into GM crops - that is increasingly impossible in France is being undertaken elsewhere, perhaps even by French laboratories or companies.

There must be renewed trust that those in charge of crises can deal with them. Yet there is a distinct lack of public confidence in the authorities. This is very plain from questioning of sixth year students in lycées, but it is also common among the rest of the population too.

Favourable conditions for entry into the markets must be created, for both new products and new services. The meeting of ideas, businessmen, financial means and organisations must be fostered.

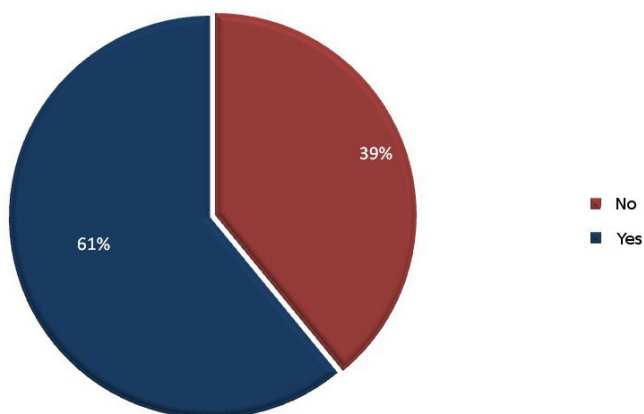
Fears change from one country to another and tolerance too. France disagrees with Germany on nuclear issues, and with the United States on GM crops. It is the same for animal testing, perception of electromagnetic waves, bioethics, embryo stem cell testing etc. The reasons are cultural and sometimes historical, such as choices of school curricula.

In the United States, while there is no problem with nanotechnology or GM crops, the creationists are blocking all debate on the evolution of the species, and are refusing research into embryo stem cells.

Each country perceives risk differently. Perception also depends on the generation. However, it is possible to map fears and assess the priorities of any policy providing for their reduction and control.

Patent applications are one stage in this process. This stage does not have to be systematic, but it can be important, and it is why we must move more swiftly towards an EC patent. However, that is not enough, given the numbers of unused patents. In certain fields, a patent is not even justified, since it may block progress and building up of knowledge.

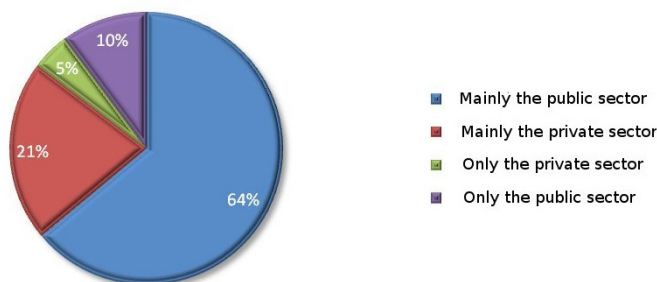
**In your opinion, do certain fears hamper innovation?**



Partnerships are becoming more and more important, be they between universities and businesses, or between large and small companies. Coordination is an asset and alliances are essential. These still budding structures have succeeded in coordinating their members' projects in a very short time. Now, they must be allowed to find new funding and the means to gain visibility in Europe and internationally.

The stability of public policy must be supervised. This goes for taxation and also for the means placed at the disposal of the research body. Currently, there is more favourable treatment of innovation by universities, the French Grandes Ecoles, the large research institutions and industry. It must not be harmed and so the policies introduced since the early 2000s must be pursued.

**Research funding in the company where you work abroad, comes from...**



Sample size: 448

The French regions play a vital role. Under the law dated August 13 2004, "the region shall coordinate the economic development of local authorities and their groupings within its territory, save in matters reserved to the State". Thus the regions lay down a regional economic plan in concertation with the various regional players, but it is not compulsory. In reality, the levers of action are all centralised and so the roles of the State and the region must be clarified.

The principle of precaution must not become a pretext for blocking research. On the contrary, it must be a principle of action. It should be emphasised that the Constitutional provisions on precaution only apply to the environment.

European research policy must be re-thought out. The Competition Commission has gained too much power, which has led to unbridled competition between European businesses and has ultimately weakened them in the face of foreign competitors for whom the requirements are less stringent and the means of coercion are virtually nil. It is time to stop being innocent and naïve.

The "Horizon 2020" strategy will only succeed if initiatives to create a new dynamic are stepped up.

Future European laboratories will emerge less from the creation of new structures than from the weaving of bilateral and then multilateral links between laboratories working on joint topics. Calls for tender demanding international cooperation will allow this process to be

hastened. What has been done nationally can easily be transposed to the European stage, although it is difficult to impose partnership creations.

Joint work must result from desire and inclination. Therefore the conditions in which people wish to group together must be created. Partnership may occur for

various reasons: the need to reach a critical mass, the need to find new funding sources, the desire to join a network that would lead to acknowledgement and recognition, and the possibility of joining forces to arrive at more interesting publications and more patent applications.

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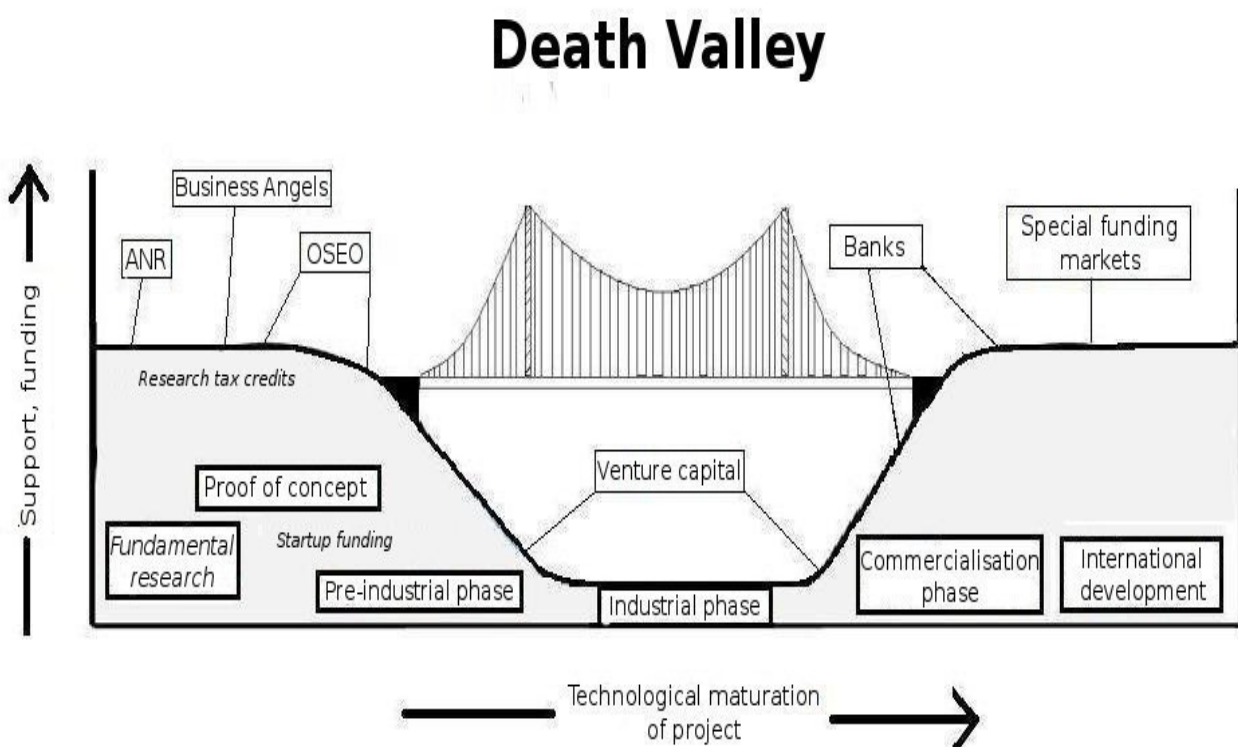
**Today we are at a crossroads.**

**Research and innovation give society a vision for the future. They will lead to future changes and will place the spotlight on the challenges of tomorrow.**

**Either the Old World views innovation as a non-priority and it will go into decline, not least in the industrial sector, as shown by purchases of photo-voltaic components from China, bio-generic drugs such as insulin from India, and electronic mobile phone components from Korea.**

**Or it considers that grey matter will be the subject of the twenty-first century's gold rush, and it recovers Renaissance creativity; in this case, it will wake up with every hope for the future.**

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ANR : French research agency

OSEO : funding and support for innovation

## Recommendations

This work led to almost fifty recommendations:

### SCIENTIFIC TRAINING FROM PRIMARY SCHOOL ON

#### **New teaching resources for primary and secondary education**

- We should change our attitude towards failure: it should be seen as learning from our mistakes and gaining experience for the future, not as a fatality.
- We should listen to the feedback from students in sixth year who vote for supervised personal work, and encourage schools to enter into partnership with innovative local businesses to assist these personal projects.

- We should train teachers by setting up awareness groups to identify experimental teaching methods and innovations to help primary and secondary school teachers.
- We should give more active support to scientific culture and the spread of knowledge.

### HIGHER EDUCATION, RESEARCH AND SERVICES TO SOCIETY

#### **Innovation as a goal for autonomous universities**

- We should encourage universities to draw closer and merge with each other. We should assist universities in grouping with Grandes Ecoles and research and innovation organisations, in order to create research and higher education clusters of critical mass in terms of international competition.
- We should strengthen the autonomous universities' management capacities by developing management jobs, not least that of manager and administrator of universities. Managerial innovation should become an intrinsic part of university administration.
- We should set up more dynamic university governance, by democratic elections for new university presidents based on a clear project and using an electoral system at regional level.

#### **We should strengthen higher education by fostering interdisciplinarity and giving doctorates a more professional slant.**

- We should acknowledge experience acquired during a doctorate as professional; give research fellows the opportunity to take time off to create a business and use more of their time to work as scientific consultants during the course of their careers.
- We should make it easier for research fellows to take the competitive examinations for entrance into the higher echelons of the civil service .

- We should improve the visibility of doctors in business by holding an annual "doctoral day" like at the University of Lausanne, during which research fellows can present their research to businesses.
- We should speed up the creation of alternating courses and apprenticeships in higher education and reinforce interdisciplinary projects.

#### **We should broaden the criteria for research assessment**

- We should change the criteria for assessing researchers in pluri-disciplinary teams so that each researcher can be assessed in terms of his or her speciality and independently of the main speciality of the laboratory where he or she works.
- We should clearly define the weighting of contributions to teaching, research, expertise, technology transfers, services to society, dissemination of scientific culture, administration and management, mediation, and participation in international projects..

- We should harmonise at European level the methods and criteria for assessment of researchers, research organisations and universities.

#### **We should make structures for making practical use of research more professional, to encourage technological innovation.**



- Universities should understand enhancement of research as a *service to society*, which should become one of the tasks of the university in addition to research, teaching and expertise.
- The agencies for technology transfers should comprise teams of real professionals responsible for forming links between researchers, financiers, managers, lawyers and economists.
- We should disseminate knowledge about intellectual property and licensing policy in universities and clarify the sharing of property rights between researchers, universities and research organisations.
- We should make incubators more professional by carrying out careful scrutiny of researchers' work, suggesting patent applications and licensing re-negotiations, helping them with legal and tax formalities, making them aware of technology watch and encouraging them to participate in start-ups.

### THE CURRENT SYSTEM: HALF ORGANISATIONAL INNOVATION, AND HALF INSTITUTIONAL RED TAPE

#### **We should create a dynamic fostering innovation ecosystems at regional level; innovation strategy should be as close to the ground as possible.**

- We should enter the third act of decentralised government, by regionalising the administrative and fiscal tools of innovation :

1) By introducing at local level the FSI (strategic investment fund) actions to support regional subsidiaries policy.

(2) By grouping public funding tools into a single public bank supporting innovation in each region, and associating the Caisse des Dépôts (French deposit bank) the OSEO and the regions in support of corporate research, which would fund proof of concept, seed capital and risk capital.

(3) By mobilising French people's savings through better communication and more appropriate incentives to increase investment in mutual funds for innovation (FCPI, fonds commun de placement dans l'innovation) and local mutual funds (FIP, Fonds d'Investissement de Proximité).

(4) By helping small structures that have decided to group together to bid for national and European contracts and help them to converge towards common goals strategically defined by the State and locally in the French regions

(5) By appropriating a greater amount of the apprenticeship tax to university centres having mutualised their resources.

- We should promote relations between SMEs and large groups within the ecosystem created by business clusters. We should encourage the creation of subsidiaries between SMEs/SMLs and large companies to facilitate mutualised export, subcontracting and co-contracting activities.

- We should network business clusters, IRT (technological research institutes) and the Instituts Carnots to create some fifteen large innovation ecosystems. We should simplify the regulatory and fiscal provisions for industries partnering these structures.

- We should create a new dynamic in Saclay and set up the Université Paris Saclay which will allow faster sharing of resources, not least by establishing more possibilities of crossing over between universities and Grandes Ecoles, and allowing more mobility between research organisations, the university and the Grandes Ecoles.

## FUNDING OF R&D IN INNOVATING BUSINESSES

### **We should share out funding between recurrent calls for projects and funding and between public and private investors.**

- We should ensure that ANR (French research agency) funding is continued, because its “programmes blancs” enable research projects to be developed, young researchers to be supported and recurrent funding to be given.
- The ANR activity report and strategic choices should be presented and discussed each year before the OPECST (Parliamentary Office for the evaluation of scientific and technological choices), upstream of budget discussions.
- We should accompany startups and SMEs to enable them to cross “death valley” and develop in France so that they will not be immediately snapped up by foreign investors.
- We should set up specific financial means to enable start ups to become long-lived businesses:

(1) by completing the research tax credit to make it a real tool for growth, by turning it into a research and innovation tax credit (CIRI, credit impôt recherché innovation), and give priority to SMIs, EICs (businesses for innovation and growth) and strategic choices. We should support joint projects set up by large groups and SME/SMIs. We should encourage innovation that moves from basic research to prototype and even reaches the pre-industrial phase in pre-defined conditions. We should stimulate the creation of highly qualified jobs by linking the amount of the CIRI to the hiring of research fellows.

(2) To support seed capital risk taking, we should increase the number of businesses benefiting from the system of advances repayable at 0% interest rates, and the French OSEO guarantee fund. We should increase subsidies and the guarantees of regional innovation funds set up jointly by the OSEO and the regions.

(3) We should increase this refundable advance, which thus forms the basis for the public aid provision, by adding OSEO funding, and OSEO would also add one or two euros for each euro from private investors, up to a previously fixed limit. This arrangement would encourage businesses to seek out private capital and thus draw more non-public investment into innovation funding.

(4) We should set up a single organisation grouping the various sources of startup funding.

- We should broaden the ambit of public provision to include support of the efforts of private investors, either financially by parallel investments, or by simplifying their administrative formalities.
- We should draw up a European equivalent of the Small Businesses Act, reserving some public contracts for SMEs. We should award these contracts to the most innovative bidder.

### **We should stabilise the legal, fiscal and regulatory position of businesses; risk must not be synonymous with uncertainty**

- We should create a new type of entity called business for innovation and growth (EIC, l'Entreprise d'innovation et de croissance) to avoid discriminating between new innovating businesses and those that are several years old, and ensure continuity in the process of innovation. We should mobilise French savings through better communication and more appropriate defiscalisation measures to increase investment in investment funds for innovation (FCPI) and local investment funds (FIP)
- We should keep the fiscal tools provided for business angels and facilitate the setting up of private seed capital investments in innovative businesses. Private investments could go up to €250,000 and any losses could be deductible from tax.
- We should set up a pluriannual timetable for credits, fiscal incentives and measures to promote innovation to create a stable fiscal, legal and social climate for innovative businesses and investors. We should give social acknowledgement to innovators in the event of failure.
- We should make businessmen more aware of the strategic importance of standards, far upstream of the industrial development of their projects.
- We should have a single European patent policy to create a true European space for innovation. We should work towards a true European patent, the cost of which should be similar to that of the American patent. We should begin thinking about whether it is useful to have certain categories of patent, such as in the living or ICT fields, or certain innovations connected to health.
- We should give priority to plant variety certificates rather than patents to protect intellectual property of plant technologies.

## PUBLIC PERCEPTION OF INNOVATION

### Better organise the interface with the public

- We should use the examples of public debates set up abroad, not least by massive use of new ICT, and creation of themed interactive websites.
- We should develop a social network watch on Facebook, Twitter, blogs etc. within the structures concerned, to measure public reactions and answer queries as soon as they arise.
- We should develop a system for European assessment and labelling of expertise to stifle the publicity given to the results of self-proclaimed experts. We should coordinate national and European expertise, which should be collegial, public and answerable.
- In the wake of the CSA (French audiovisual council) call for tender, we should create a television channel dedicated to promoting science and scientific culture
- We should set up a double diploma and lifelong education in epistemology for journalists, high ranking civil servants and judges.
- We should set up teams in universities and research organisations to liaise with associations such as those for patients, to offer them expertise and advisory services in topics of interest to society.
- We should found an Observatory that would map risk and perception of risk so as to arrive at a consensually agree scale of risk .

## RESPONSES TO THE FEARS EXPRESSED BY SOCIETY

### The principle of precaution as a principle of action

- We should make laws to define the scope of application of the principle of precaution, which is currently of constitutional value only in the field of the environment, and turn it into a principle of action. This is because innovation cannot be paralysed by an overly scrupulous interpretation of a principle which should above all allow more research and not its complete cessation.

## INNOVATION, DRIVING CONTEMPORARY SOCIETY

### Innovation in the international context

- We should develop bilateral and then multilateral relations between research laboratories in European countries, to create European clusters or consortia such as Arianespace or EADS.
- We should facilitate crossborder cooperation. Fiscal and social distortions are such that innovation will only be able to develop if cross border free trade zones are created in a few areas in France.
- We should set up a far more ambitious programme of themed research and studies at European level by means of clear, simplified and less bureaucratic procedures.
- We should launch a wide-ranging European innovation funding project, backed by the EIB, to support venture capital.
- We should simplify and harmonise the provisions for calls for projects at European level, similar to those for national calls for projects.
- We should make courses more international, stepping up the Erasmus exchanges at Masters level, promoting jointly-directed doctorates and simplifying the formalities for receiving foreign students.
- We should increase cooperation with Southern countries, not least on topics such as agriculture, energy, water and health.
- We should transform the ERC into a truly European agency for research, co-financing priority research projects with member States.