

THE EXPLOITATION OF RESEARCH

Public hearing of 16 December 2008,

Organised by MR CLAUDE BIRRAUX, President of OPECST,
MR JEAN-CLAUDE ÉTIENNE, First Vice-President
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How can links be organised between research and innovation? What are the levers of an exploitation policy? What barriers does it face?

This public hearing, organised by OPECST (Parliamentary Office for Scientific and Technological Assessment) received the testimony on this topic on the part of public and private players.

Various instruments have been set in place. The programme Act for research of 18 April 2008, for instance, has enabled research establishments, poles and networks, to entrust the management of exploitation activities to private-law entities and has tasked OPECST with assessing the initiatives taken in this framework.

Assessing the application of this measure was an opportunity to take stock of the exploitation policies implemented in France and set out the outlines of the outlook.



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I - THE FRENCH PARADOX : RESEARCH RECOGNISED FOR ITS EXCELLENCE YET WHICH IS STRUGGLING AS REGARDS ITS EXPLOITATION

While the quality of French research is recognised, innovation has well and truly fallen behind: five years behind with respect to Belgium, Germany, Great Britain and the Netherlands, and ten years with respect to the United States and Israel, according to some indicators.

France urgently needs to catch up with the top innovating countries. In this context, the exploitation of research (research partnerships, exploitation of intellectual property, creation of companies stemming from public laboratories, mobility of researchers between the public and private sectors) is strategic in a globalised economy.

The extreme concentration of research contracts at some establishments

Through the programme Act for research of 18 April 2006, the legislator was determined to promote the conclusion of partnerships between research establishments and private companies. In effect, the present system suffers from a very great concentration of research contracts at some establishments. By establishing the ratio of the amounts of contracts to the research expenditure of establishments, a clear gap appears between the CEA laboratories (LETI and LEST) which obtain the highest results in almost all scientific disciplines where they are present, and universities and CNRS, which cover only 3% on average of their research expenditure by contracts with companies.

Out of the first 20 Carnot institutes (forming a network in France of 13,000 researchers having the common goal of developing partnership research with companies), CEA is well ahead of the other establishments.

The dispersion of structures tasked with exploitation and the persistent divide between the world of companies and that of research

The entanglement of structures tasked with the exploitation of research is causing confusion, information loss and the sprinkling of funds. A low professionalisation of teams is also to be lamented owing to this situation. Each laboratory tends to do everything whereas the exploitation of research is a job in itself. It therefore took time to convince researchers that the inventor is not the owner, that the owner is not the negotiating representative and that the latter is not the sole recipient of a possible financial income.

Also, most partnerships are concluded with large companies, small companies finding it difficult to access them. Small companies would like a 'one stop shop' directing them to the platforms, technopoles and incubators which could help them.

Laboratories still too often see companies as a possible funder of research work or equipment, without any real long-term cooperation or any genuine adaptation of

research programmes to the needs of the economy.

Research organisms in the front line

Research organisms have explored all the legal solutions to develop exploitation: internal structures with specialised teams or exploitation subsidiaries. And the results are promising.

For instance, between 2000 and 2007, the number of inventors from CNRS rose from 1,000 to 3,200; 12% of all the personnel likely to file a patent did so in 2007. 41% of patents are exploited by a manufacturer after one year. But figures are of interest only by comparison. The number of invention disclosures by CNRS stands at the level of the top American universities: 484 for CNRS, as against 518 for the University of Stanford and 523 for MIT at Boston. The number of patent applications is close to that of MIT – 316 as against 321 – but lower than that of Stanford: 541. On the other hand, the number of patents issued is clearly higher than that of the top American universities: 284, as against 118 for Stanford and 121 for MIT. As regards licences, CNRS is roughly on an equal footing with Stanford and Boston – 104 as against 109 and 121 respectively – but the number of start-ups is far higher. The *Max-Planck-Gesellschaft* has to its credentials only two start-ups, 30 licences and 79 patents issued.

INSERM for its part, opted in 2008 for a private-law subsidiary, following the example of what exists at the University of Louvain, the Massachusetts Institute of Technology or DKFZ in Germany (research centre against cancer). The priority of this subsidiary is to create a culture of innovation, and ensure proactively that a supply of disruptive technologies meets a growing demand from the industrial world. The main client of INSERM-Transfert, the pharmaceutical industry, subcontracts 50% of its disruptive innovations research budget to the academic world.

As regards private subsidiaries for technology transfer, two major organisational models coexist. In Anglo-Saxon countries, project managers manage the detection of invention, industrial property strategy, its negotiation, contractualisation, and then its follow-up and development in industry. French

engineers and technicians have little control over project management and technology transfer still lacks professionalism.

Therefore INSERM-Transfert has made the choice of organising itself in technical departments, which shall in a first stage develop their expertise and professionalism to reach levels of international excellence.

INSERM has equivalent performances to an average American university, in other words five million euros of licence income. For an equivalent budget, the Medical Research Council generates a hundred million euros of annual licence fees. The Medical Research Council, Stanford and Harvard Universities, and the University of Louvain have progressively managed to create a virtuous circle of innovation based on reinvestment in research.

The research directorate at **CEA** manages more than two hundred million euros of industrial contracts ensuring 75% of its funding, even though it is a public entity. CEA files 400 patents a year, in other words one patent per million dollars of turnover, which rates it at the best level worldwide. CEA has more than 400 industrial partners.

Catalysts for innovation have been created within excellence centres and group higher education, applied research, and players from companies and the economic world, such as MINATEC at Grenoble, INES at Chambéry or DIGITEO Labs at Saclay.

CEA operates according to an original business model: industrial property is the capital of which the benefit is granted to manufacturers in the form of licences. This supposes a search for clients, with 155 sales representatives trained in commercial negotiation.

INRIA (National Institute for Research in Computer Science and Control) has a very dynamic exploitation policy. In effect, technology transfer is one of the remits of this establishment in the same way as research, the institute coming under two supervisory ministries, research and industry. Transfer can take place by creating a company, granting a licence, participating in standardisation activities, making open source software available to an industrial community, or setting up a consortium with manufacturers to exploit a technology.

Partnership research concerns above all the R&D departments of large groups and can take the form of joint laboratories with the sharing of personnel and the definition of strategic activities.

INRIA is endeavouring to strengthen technology transfer to SMEs: its own spin-offs of course – a hundred or so of them have been created in the past 25 years – and also innovating SMEs.

Turning to **INRA**, its technology transfer policy reflects its highly dominant position regarding plant and animal products, whereas in the field of the processing of products and of nutrition, its competences partly overlap those of other establishments. 'Bipolar' valorisation forms another specificity of INRA whose first 'clients' are the 400,000 French farms.

Two transfer companies, 100% subsidiaries of INRA, have been created: INRA-Transfert SA with a turnover amounting to 7.5 million euros and a portfolio of 350 active licences, and Agri-Obtentions SA which holds 500 highly specialised protection documents.

International competition monitoring by the partners concerns a hundred or so industrial groups worldwide.

50 to 80 invention disclosures are examined each year and the profit sharing for researchers represents 1 million euros, for 300 licensees, in other words slightly more than the average of similar establishments. Over the past eight years, INRA has incubated 45 start-ups.

II - PROMISING PROSPECTS

Recent reorientations of the research exploitation policy

Beyond the measures it undoubtedly introduced regarding incubators or the creation of companies by public research personnel, the 1999 Act on innovation and research acted as a genuine 'trigger' in the mind of French researchers.

The Bayh-Dole Act in America played the same role of a trigger in American society. However, technology transfer in the United States experienced the strongest growth rate in the mid- 1990s, in other words fifteen or so years after the Bayh-Dole Act. As the Act on

innovation and research was passed only nine years ago that leaves great hope for the years ahead.

New instruments have been created, such as the status of the young innovative company, competitiveness poles, seed funding and Carnot institutes. For its part, the programme Act for research of 2006 created the PRES, which are research and higher education poles.

The age of maturity is finally beginning to arrive with the 2007 Act on universities, which places exploitation on the same level as research in the list of remits entrusted to higher education and research establishments. Exploitation was a matter addressed after a certain number of other remits; henceforth *'scientific and technological research, and the dissemination and exploitation of its results'* are placed on the same level.

The considerable efforts by universities to catch up

Over the past ten years or so, the barriers to the development of partnership research in France have begun to be removed and especially since the 2006 Act which introduced PRES. These poles are aimed at coordinating higher education and research establishments in a given territory and giving them international visibility by developing their relations with companies. The 'plan Campus' aims in the next three years to make these university poles international champions of research, training and innovation. For this purpose, the minister has selected 15 sites which will be so many excellence clusters. In Lyon and in Brittany, PRES exploitation departments have already been created, which are mutualised and 'one-stop' departments, easily recognisable by manufacturers and having a critical mass.

These departments accompany researchers at all the stages of the exploitation process.

This function mobilises high amounts of funds, for an uncertain return on investment and, when it exists, quite remote in time: a period of five to six years is necessary between the filing of a priority application and effective financial exploitation, when it takes place. Universities must therefore be in a position to

benefit from high-performance exploitation departments. The setting up of these at the level of PRES has met this requirement.

Going against received ideas: in France, does public research compensate for the weakness of private research?

An end must be put to the spreading of misperceptions or even of false figures on the exploitation of public research in France. Does the customary diagnosis take account of reality? The cause of the French delay does not necessarily reside in research or in the exploitation systems, but is perhaps related to industrial innovation itself.

In effect, research is often more of a showcase than a genuine means of driving corporate growth; this phenomenon can partly be explained by the insufficient innovation training received by company managers and by their lack of knowledge of the world of research.

Recently, measures have been introduced promoting doctorates in companies and these are heading in the right direction: the CIFRE scheme (industrial agreement for training via research) which accompanies companies recruiting PhD students; and PhD advisers sent by their university on consulting assignments at companies.

Simplification of intellectual property management rules

These rules will soon be simplified for public operators.

The laboratory host behind a discovery, in other words most often a university, will therefore become the single manager of a patent. This manager will take care of exploitation while sharing profits from the patent with the other laboratory funders.

Changes are also desirable at the European level; in this respect, the Community patent is expected to offer better opportunities than the European patent.

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