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Operation FutuRIS – France 2020

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Authors: Isabelle Chatrie of Louis Lengrand and Associés isa@ll-a.fr
Julie Rachidy of Louis Lengrand and Associés julie@ll-a.fr

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Type: National foresight exercise
Organizer: The ANRT - Association Nationale de la Recherche Technique
Duration: 2003 to 2005 **Budget:** €4M **Time Horizon:** 2020

Motivation

Operation FutuRIS is the result of an initiative launched by the French Association for Technical Research (ANRT) to bring together leading players of the public and private sectors with the aim of laying the foundations for the future of the French Research and Innovation System. FutuRIS is a systemic foresight exercise that uses a number of exploratory scenarios to simulate potential changes from which key issues can then be identified.

How will the French Research and Innovation System meet the Needs of Society?

The French Research and Innovation System was established after the Second World War. Today, the field of knowledge has widened and the French economy now operates as a part of the European and global economies. The current system has made it possible for France to stake a claim in several major markets. With the exception of microelectronics however the existing system has produced far less satisfactory results in the area of information technologies.

There are increasing doubts as to the ability of the current Research and Innovation System to meet the needs of French society in the future. Reasons for this are related at least in part to changes that have occurred in the political, economic, social and technological context over the past fifty years. Rather than restricting the foresight exercise to a critical review of the present situation of the French Research and Innovation System, FutuRIS is intended to analyze the challenges the system is likely to face in the period 2000 to 2020. It uses a foresight approach to look at a relatively wide range of possibilities for the future.

The three main objectives of this foresight exercise are to:

- Define France's strengths and weaknesses and the main trends in innovation,
- Identify the central principle that will drive the evolution of the French research and innovation system in the period 2015-2020,
- Make proposals for improvement of the system based on laws for the orientation and programming of research.

A Cooperative Approach

The exercise is organized by means of a **Steering Committee** that comprises 25 members coming from the research and education community, enterprises, public sector and society, an **Orientation Committee** which is effectively a consultative team to supports and validate the work of the operational team on a regular basis, as well as a **Central Team** in charge of executive work and a **College** which has a dialogue function.

The **EFMN** is financed by the **European Commission Directorate General for Research** as part of a series of initiatives intended to provide a **Foresight Knowledge Sharing Platform** for foresight practitioners and policy makers in the European Union. More information on the EFMN and on the Foresight Knowledge Sharing Platform is provided at **WWW.EFMN.INFO**

Four expert working groups – '**Groupes Défis**' or 'Challenge Groups' - were established to discuss the following issues:

- Scientific and technological excellence for the future,
- Competitiveness through research and innovation,
- Interaction between research, innovation and the citizen,
- Dynamics of the French Research and Innovation System.

They each comprise about 25 members and meet once a month. Their main tasks are to identify key variables on the respective topics, to formulate hypotheses or principles for the evolution of the system as well as emergence of discontinuities in its evolution, and build mezzo-scenarios with a 15 year time horizon. Data, reports and roadmaps are collected through a wide network of correspondents that consist of about 150 experts who mainly interact through electronic means.

After the initial 3 month period of implementation a 2 year-exercise was planned as follows:

- A production phase from May to September 2003 in which key variables would be identified and analyzed,
- A consolidation phase from October to December 2003 in which scenarios were built through the development of evolutionary hypotheses, the identification of mezzo- and macro-scenarios and discussion with networks of correspondents all of which concluded with a large seminar in order to discuss the scenarios,
- A validation phase from January to February 2004, in which the work was finalized with a major closing conference that led into a second year of broad consultation,
- A consensus phase in 2005 in which the results were widely discussed with stakeholders.

Main Conclusions

Focus on the Social Value of Research and Innovation

Results of research and innovation contribute to meet social needs especially by improving social well-being. This point is particularly relevant in European societies with low levels of population growth and high levels of fixed capital because the increase in revenue mainly comes from intangible investments in research, innovation, education and training. According to economic experts, it is possible to envisage that unemployment, compounded by the rising number of pensioners (2010-2020), might lead to an explosion in social spending that would result in the breakdown of the current system, assuming that economic and social systems remain unchanged and that the economy does not return to sustained growth.

On the other hand, changes in democracy will continue to transform the relationships between science, technology, and society. It will no longer be just a matter of keeping citizens informed of developments in science and technology. Instead, it will be necessary to incorporate research and innovation into the interaction between scientific, political, economic, and social trends. Beyond questions on the existence of a basic consensus regarding values, behaviours may result in differences of opinion as to what is at stake, which would create major tensions. In this sense, group 3 (interaction of research and innovation with society) concluded that: "reviving ambitious innovation policies requires an open and informed debate, looking at the innovation process both in terms of its goals and the methods used".

Need for Greater Resources Allocated to Health, Life Sciences and Biology

Figures show that the scope of the field in which France is expected to compete is not compatible with the resources allocated to research and development. Thus, development of eastern and southern Asia will lead to major changes to the global geopolitical and economic map, which will modify the balance of power in the area of research and innovation.

Investment in research and innovation has major long-term effects and any delays are virtually irreversible. Some of the main strengths of French industry today are the result of decisions taken in the 1960s. As regards technologies, France and Europe missed out on the IT revolution in the 1960s and have only partially recovered, due to the telecommunications industry boom. The next two technological revolutions are likely to concern:

- The field of **health and life sciences**, which are linked but do not coincide. Noting that biology in France already lags behind the US, we can ask whether this is irreversible or can it be brought under control?
- Closer **ties between biology and information and communication technologies**, in which Europe runs the risk of being relegated to a tiny role if current trends persist.

In this respect, specific attention should be paid to sectors that are at a crossroads between fields. Examples are hardware, nanotechnologies and certain biotechnologies. If Europe was to lose ground over the next decade, the fallout would still be significant in 2030. In addition, it appears that:

- No European country with the possible exception of the UK, is capable of maintaining an adequate security and defence system on its own.
- In terms of R&D, strong European partnerships are essential for the creation of global centres for excellence.

If Europe and France do not devote enough resources to these areas, economic growth which is already at risk of slowing down will be compromised.

European R&D's Future in a more and more Competitive Environment: 5 Scenarios

The scenarios are designed to enable a systematic review of possible changes in the FRIS over the next 20 years, with the goal of shedding light on a number of key issues. In this way, it will be possible to assess the consequences of a certain number of events and public policy options. Six scenarios were developed:

- **Scenario IA - Defensive Decline** where Europe is struggling to become organized. Public research is losing its relevance due to funding cutbacks. France is forced to abandon part of its current RDI objectives.
- **Scenario IB - Opportunistic Passivity** international economic growth is stronger, leading to a slight increase in the volume of public research focusing on high-potential fields for the future.
- **Scenario II - a Wager on National and Regional Dynamism** in a world marked by conflictual relationships and relatively low levels of growth, the European Research Area is unable to progress due to a lack of agreement between member states. However a relatively positive pragmatism enables structural changes in public research and the development of RDI in SMEs nationwide.
- **Scenario III - Ambition for France and Europe** in a quite similar context, but with comparatively favourable growth, the European Research, Innovation and Higher Education Area is set up, with major programs including defence-security R&D.
- **Scenario IV - Pragmatism in a Europe of Regions** in a context of a US leadership and relatively strong economic growth, China and India are emerging relatively smoothly so that geopolitical balance is being called into question. A European Research, Higher Education and Innovation Area is set up with major programs, but this excludes defence-security R+D, state reform and decentralisation is accompanied by structural changes in public research. With this scenario there is a risk that Europe will become too fragmented and that this fragmentation at regional level could cancel out expected benefits of the scenario.
- **Scenario V - France a Player in a Powerful Europe** in a multi-polar world of regulations based on the US, China, India, and Europe, with relatively strong levels of growth, an ambitious European Research, Higher Education and Innovation Area is set up, ranging from basic research to major programs and defence-security R&D, the public has greater confidence in innovation, and this derives from more open and transparent debate processes, the reform and decentralisation of the state is accompanied by structural changes to public research, which is organised around regional centres.

Key Political Issues

This foresight exercise underlines new approaches to organisation, finance, marketing, logistics, software development, research and training. In this context according to the expert group, horizontal economic and social policies should ideally include:

- Actions offering compensation for the underprivileged, while avoiding the maintenance of obsolete structures,
- Macroeconomic policies to facilitate sustained economic growth
- Employment policies aimed at reducing unemployment by increasing labour market flexibility,
- Life-long education and training policies that foster initiative-taking and that increase the adaptability of the workforce.

In addition to these horizontal policies, more selective actions could be taken if there are economic and social externalities, when the market focus is too short-term, when there is a need to compete for subsidies received by foreign competitors, or when there are major imperfections in the functioning of the venture capital market.

Therefore it is now necessary for France to make choices: the country, while continuing to improve the productivity of its R&D system, must reconsider its R&D objectives and/or increase public R&D funding. Without major reform, there is little chance of the Lisbon objective of 3% with 1% public - 2% private being achieved over the next 20 years.

The first proposed reform would involve entrusting responsibility for research in the broadest sense of the term to a large and fully-operational ministry. However, this responsibility must not include the management of public research organizations. This 'Ministry of the Future' must make strategy the priority and guarantee a long-term focus. Its scope should include the world of businesses and the economy as well as state institutions.

Secondly, France lags significantly behind comparable countries in terms of private sector funding for innovation. The state can only influence its policies through actions to make research an attractive option for business investment France. There are three types of action that need to be considered:

- The extension of research tax credits. These have the advantage of being an automatic incentive applicable to all companies,
- The creation of centres of excellence for research and innovation in the fields that will result in major economic activities,

- At the crossroads between public research and private research lies the key issue of intellectual and industrial property and valuation policies.

Many of the prominent experts interviewed believe that a public R&D policy needs to be set up at the European level. More specifically, the proposals for the financial outlook for 2007-2013 presented in February 2003 by the Commission express a strong desire to promote the competitiveness of businesses and ramp up European research and technological development efforts, including the space and security sectors. European budgets will be granted as contracts for long-term projects. This study has, however, raised a number of problems:

- How to handle the strategic management of European R&D;
- How to prevent the allocation of European contracts from being affected by a bureaucratic and inefficient fragmentation of resources;
- How to increase the flexibility of resources for French public laboratories so that, in terms of total costs, they are able to cope with changes in their income over time.

At last, it is more specifically at the local level that it is important to take actions to develop close relations between public research and the economic environment, notably in the main regional centres. In terms of the actual amount of funding, the regions play an insignificant role at present. The scenarios show that without a large-scale reform of tax transfers and without initiatives to establish the decision-making bodies required, the role of the regions will remain a secondary one. Nevertheless, because they have access to structural European funds, and are active in the development of the region, they have the potential to be an 'active component' of Operation FutuRIS, notably by contributing to the emergence of powerful centres that bring together higher education, public research, innovative business creation, and industrial research.

Policy impact

The main report on Operation FutuRIS was published on 5 October 2004. In it the four working groups identified about fifty parameters likely to influence the future of the Research and Innovation System in France. These results are being used in the on-going S&T policy debate in France and provide inputs for the new orientation and programming Law on Research. They have been used as a basis for general debate on the future of research in France. The scenarios are being used as input for the following R&D policy issues:

- The source and structure of funding for public research, how to match resources to objectives within the system, and human resource needs in public research,
- Europe, Regions, Nations and pôles as 'public engines' of innovation, the European dimension of R&D and the role of large programmes
- R&D and innovation in firms, the structure of financing for private R&D and the attractiveness of territories on the location of R&D

This exercise served as a collective learning and analysis tool. It supports a policy debate where the research and innovation system is considered as a whole with the complete range of associated objectives. In January 2005, FutuRIS produced a new document that contains 15 proposals for reform of the French System of Research and Innovation.

Sources and References

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- 'Le système français de recherche et d'innovation : Proposition pour une réforme' ANRT février 2005
- 'Avenirs de la recherche et de l'innovation en France - sous la direction de Jaques Lesourne, Alain Bravo, Denis Randet', Les Etudes de la Documentation française n° 5200 (Octobre 2004)

Relevant Links

http://www.operation-futuris.org/dyn_menu.asp
http://www.futuris-village.org/index.htm
http://www.anrt.asso.fr/index.jsp