



Projet Sciences en société

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RODAMAPPING SCIENCE TO SOCIETY

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Opening Lecture (frame)

I - "Science in society", a relevant question in our societies and a vital question for scientists and their institutions

A - Historical background shows that science is a strategic activity in our world

Renaissance period : development of art and science, classical science has emerged (capacity to translate observed phenomenon to mathematics, and ability to calculate future situations), (as by Bacon and Descartes)

Free from old thinking established by Aristoteles (the thing in itself); Kant establishes in 1781 the fundamental questions exercising human thought: "what can I know?" Formal conditions for all objectifiable experience, Kant frees science from the straitjacket of metaphysics. He opens the path to scientific modern discovery through the Enlightenment century, and later to the XIXth and XXth centuries main discoveries, in physics, biology or social sciences.

Capacity to maintain science is a very big asset in our societies, because science gives both knowledge and power, which has become now a centenarian tradition. There is no social or economical problem without a proper contribution of science and technology; compare grandparent's life and our life in all fields !

Four centuries of history of science in our societies show that it is a big success (and asset), and it was broadly imitated by many nations of the world. Let's just remind briefly that modern science is a European invention.

B - Consciousness, connotation and denotation (Rabelais, Wissmann, Blumenberg)

But Rabelais had written in *Pantagruel* (1532) that « Science without conscience is but the ruin of the soul ».

During the Renaissance, there was a strategic reversal: scientists, in the modern sense of the term, declared they would now decipher "the Book of nature". Following Blumenberg's radical approach in "*The legibility of the world*", interest guiding



scientific endeavour cannot be expressed directly in the scientific idiom. It belongs in its initial form to the common language (Einstein : "The whole of science is nothing else than a refinement of everyday thinking").

Modern science language is denotative : it is based on the assertion that it designates all realities identically for everybody. It is a de-notative construction. So science tends to be a Babel language, clear and universal, one to one. But it may loose access to the initial sources of its own anxiety.

So, using Blumenberg's hypothesis, one can suggest that the influence of science in our modern societies is dependent on an inspiration that scientific language cannot reproduce in its entirety. And boasting the successes of science by using scientific language is probably not the efficient way, though it is very difficult to talk about science out of its own language, without contradicting the legitimate methodological requirements of science.

It is suggested "that only an educational programme which places connotative language- today the national languages which arose with richness from history - at the centre of a revamped curriculum for learning can provide us the basis for profound thought on the interests which have been lending legitimacy to scientific endeavour since its outset. We should immerge ourselves in the historic authenticity of our heritage, so that schools become places where we speak in tongues. Here is the place where the future of science will be decided.

As there is no social and economical activity in our societies which does not include an important science component, it is an urgent necessity to come back to the consciousness suggested by Rabelais, as a common point to scientists and their embedding society.

C - From « science as a myth » to concrete science, made of social networks (Latour, Callon, Nowotny, Muldur and Caracostas)

Science as a myth

Curie, Pasteur, Edison, Einstein, and many others have contributed to build a myth around the power of science, due to the depth and range of their discoveries. The consequence is that in public opinion surveys, the scientist, as a figure, gets the best ranking compared with other figures like artists, physicians or even political personalities.

This historically built figure of scientists is a big asset in public opinion, and in public decision.

Science as a social activity

The last century has been dedicated to the creation of scientific institutions as well. The founding model was proposed by Vannevar Bush, adviser to Roosevelt in 1945, after the Manhattan project - it consists in recruiting the best educated people and to fund their research activity with public money. Many very selected people had been involved in the Manhattan Project and their activity was then turned to civil society (agriculture, energy, transportation, health ...).

The conjunction between well educated people and public funding was imitated or enhanced in most countries in the world. Science gained the status of a "public good", able to support social initiatives

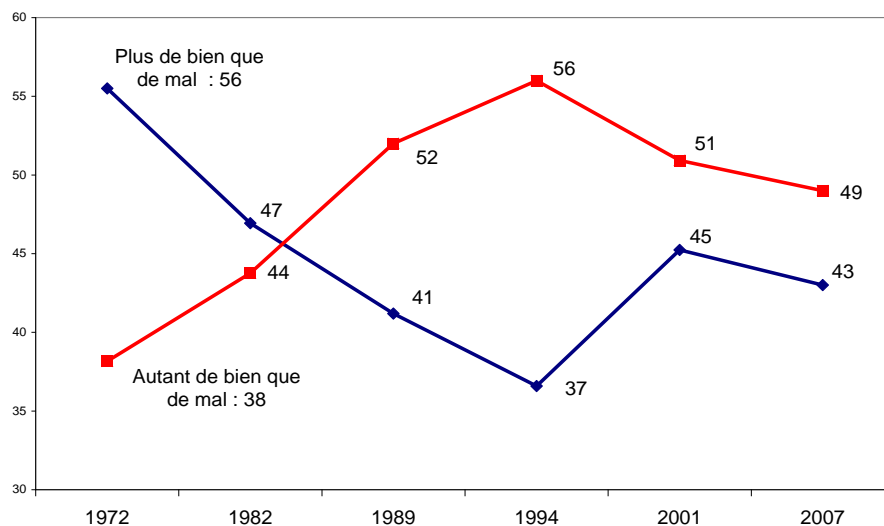


Since 1945, a three steps evolution from "Science, the endless frontier" to "Society, the endless frontier". Different kinds of building science policy have appeared (Muldur and Caracostas):

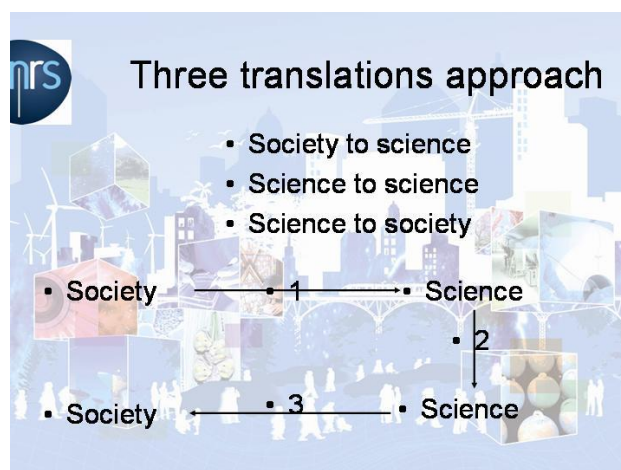
- Science as public good publicly financed, which is still a deep model.
- Science as a specialised function collaborating with actors of economy to support innovation. During the 60-70's, growing firms at international level needed support of research to increase their competitive advantage, in traditional sectors as well in new sectors like computing.
- Later on have appeared the preoccupations of society, through consciousness of the change induced by human activity on the planet, or by patients associations and their influence on scientific activity.

Those different constructions are components of the modern scientific systems.

The perception of science in public opinion (Boy)



D - Three translations scheme (Callon, Barthe)





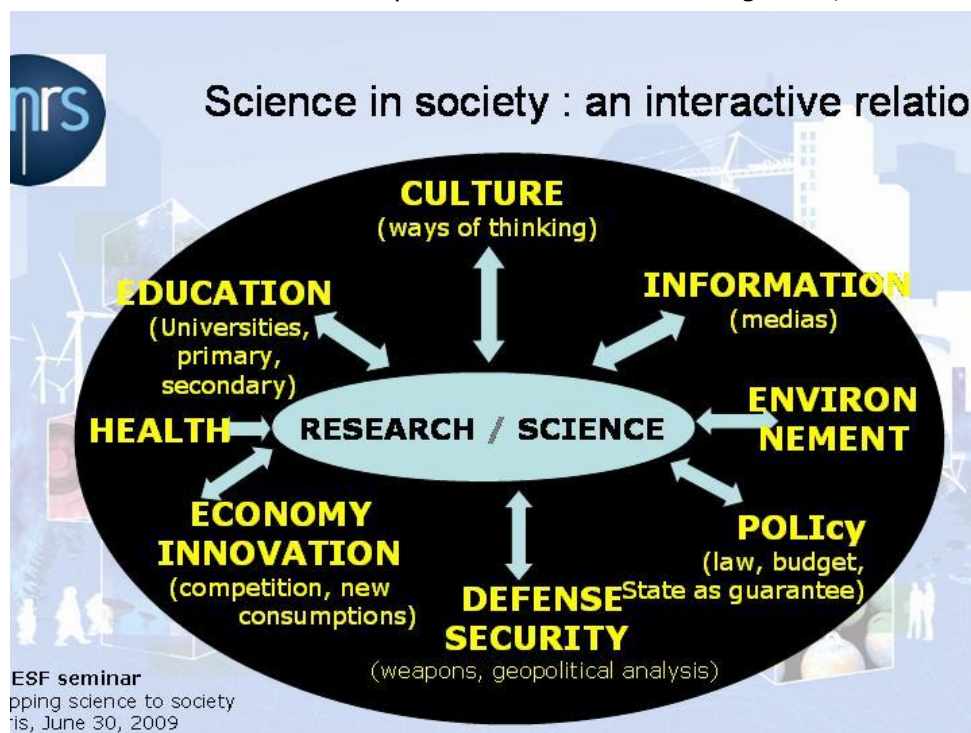
We need a figure to represent society.

In this scheme, we propose to consider society as a **set of actors**, who have the responsibility of major functions like education, economy, security, etc. Each of them has been building its institution, private or public. Policy is the management of the interactions. The interaction between all of them (the sub systems) is defining social life. Science plays now a major role in those processes.

In this view, science is not reduced to its own activity. It has to be involved in a continuous cycle, which includes three steps (the three translations) at different paces of time :

- translation of common questions or preoccupations to scientists,
- scientific work with respect to the scientific methodology,
- and dissemination or translation of knowledge which was acquired and certified at international level to society. The main actors are vectors for translation of science into usable knowledge and actions. Without their action, science stands in the field of science itself.

But their role is not only to translate scientific information into practice where they stand. Their technical and social practice creates knowledge too, which relies on



different legitimacy bases. This knowledge is the deep soup in which science is solved on one way, but it may be active and propose questions of interest to scientists in return. Society may ask some interesting questions like 'how to mix peasant's culture and technical culture concerning soil or machines, how to compare and study Chinese traditions and Occidental approach of medicine, ... or ask why GMO should be disseminated in nature without knowing the impacts, or how to build energy mix for the future. That's already the case in some fields like medicine where 'patients' associations play a major role (in relation with INSERM in France or at European



level). Patients know a lot in a practical manner about their own illness, they share the information with scientists, drawing their attention.

II - Background and programme of the seminar

A - From « deficit model » to intercultural approach and dialogue (conceptual background) in uncertain situations

A – The relationship between science and society should be thought over in a systematic way, especially because more and more worrying signs show that the key societal publics are losing interest in science.

B – Science should communicate with all the actual and potential users of research in order to translate scientific knowledge into innovation and public knowledge, but also to map their present and future needs that science has to satisfy.

C – The scientific community and the European scientific organisations should work on further methods, forums and management tools in order to improve and enhance democratic communication with social partners

D – Many partners are concerned such as policy makers, citizens, industry, medias, education system, environmental lobbies, health system.

B - Topics to be discussed by the seminar

Goal: possible actions driven by ESF with a European added value

- Reinforce shared thinking
- Evaluate institution's capacity to act

Take benefit from the many reports and publications since 2000 (ESF, UE, OECD, national reports).

1 – Impact

As Christophe Kratky said in 2007, "the discussion about the relevance of basic scientific research is pandemic, and it is anything but trivial".

- Choose the relevant publics, which is a larger question than simply talking to politicians or industry representatives.

Example of the "Grenelle de l'environnement" recently launched by the French government.

- Elaborate correct methods to qualify and calculate impacts (Stern review for the cost of climate change, or medical research: what's worth, commissioned by UK evaluation forum)

2 – Evaluation

- Which kind of value? Scientific, societal, mixed? Criteria?
- Who evaluates?
- Clarity of processes
- Indicators



3 – Accountability

- Characterisation of the different perceptions of risks
- Establish dialogue in the best conditions (cf. OECD workshop)

C – In what sense is this proposal new ?

Concerns norms for science

Science of science policy



III - Figures for optimism

A - « Scientists connected with society are more active academically » (Pablo Jensen)

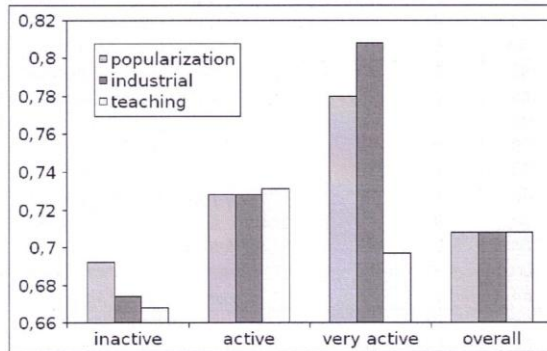
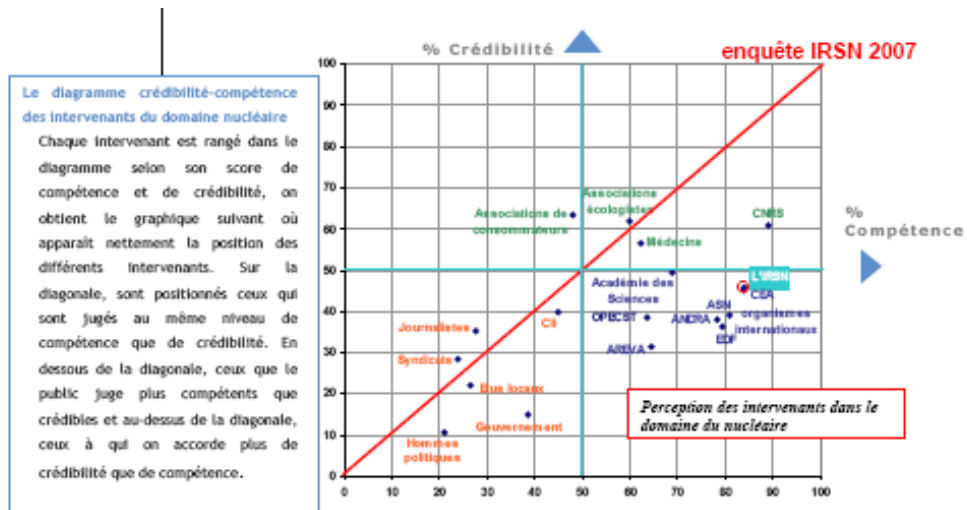


Figure 3: Average h_y for inactive, active, or very active scientists (see Table 1 for the definitions) in the different dissemination activities. Again, we exclude researchers in Social Sciences because their bibliographic record is not well documented in WoS. Variance tests on the indicators ensures that they are strongly significant (for popularization: $F = 6.9$, p -value = 0.01; for industrial collaborations: $F = 18.6$, p -value = 0.00004. For teaching, active scientists have a significantly higher h_y than the non active, p -value = 0.0003). However, contrary to dissemination, the very active ones have the same h_y than the mean (the small difference is not statistically significant). Our data point to an “optimal” value of roughly 20 - 30 teaching hours per year, additional hours lowering h_y ...

B - A high level of competency and credibility for CNRS as a basic science institution (IRSN)





C - Are you trusting or not (%) (Boy)

"Much or very much":	2000	2007
Science	88	90
Police	75	70
Administration	63	66
Justice	52	55
National Parliament	43	46
Big firms	58	46
Medias	29	25



IV – Main sources

- *What did we want to know?* by Heinz Wismann, in "Science in society: dialogues and scientific responsibility", a conference of the French Presidency of the European Union, MURS ed., nov. 2008
- *The legibility of the world*, Hans Blumenberg, 1979
- *Les trois traductions*, Michel Callon in *Science et devenir de l'Homme*, Nr 42, MURS ed., <http://documents.irevues.inist.fr/handle/2042/6817>
- *Le progrès en procès*, Daniel Boy, Presses de la Renaissance, 1999
- Enquête annuelle IRSN, 2008, www.irsn.org
- *Scientists who engage with society perform better academically*, Pablo Jensen, Jean-Baptiste Rouquier, Pablo Kreimer and Yves Croissant, *Science and Public Policy*, 35(7), August 2008, pages 527–541; DOI: 10.3152/030234208X329130
- *Society, the endless frontier*, Paraskevas Caracostas and Ulgur Muldur, European Communities 1997, EUR 17655
- *Re-Thinking Science: Knowledge and the Public in an Age of Uncertainty.*, Helga Nowotny, Peter Scott, Michael Gibbons, London: Polity Press, 2001
- *Historical Perspectives on Science, Society and the Political*, Dominique PESTRE, 2007, <http://ec.europa.eu/research/science-society>
- *Taking European Knowledge Society Seriously*, U. Felt & B. Wynne, European Communities 2007, EUR 22700
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