Scientific Advice for Policy in France

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ABSTRACT: The concept of a "science for policy ecosystem" is increasingly being used at the European Commission's Joint Research Centre, and has been operationalized in a series of reports on several European countries, published in 2021-2022. Using an original methodology developed in one of these reports, this paper describes the French science for policy ecosystem, focusing on the scientific advisory bodies for environmental and public health matters. Beyond this specific case study, the paper reflects on the theoretical and methodological implications of the concept, in the light of the literature in Science and Technology Studies (STS) and in policy sciences.

KEYWORDS: science for policy ecosystem; public health; environment; advisory science; public policy

1. Introduction

Contemporary decision-making in the European Union is often described as highly knowledge-based, and particularly grounded in scientific knowledge. Science is widely viewed as a significant resource for policy, which is reflected institutionally in the role of science for policy organizations, which are expected to provide the raw knowledge needed for decision-making and public action. Recently, the term "science for policy ecosystems" has been coined as a way of viewing these structures as a whole, and analyzing them at national level, including their interactions and respective roles. This comprehensive understanding of how science for policy works has the potential to facilitate the management and steering of the production of scientific knowledge for decision-making across an entire country, rather than this management being fragmented across particular organizations. By providing an aggregated, national-level view of science for policy in EU Member States, the term "science for policy ecosystems" has proven useful for structuring work on this topic at the Joint Research

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Centre (JRC) of the European Commission. The JRC has therefore produced a series of reports on national ecosystems, including countries such as Denmark,[1] Portugal,[2] Greece,[3] and Lithuania.[4]
This paper draws on the work[5][6] carried out by the author in 2022 as part of this series of reports initiated by the JRC, and broadens the reflection on its findings in light of the literature on Policy Advisory Systems (PAS) in the fields of policy sciences and Science and Technology Studies (STS).

2. Background to the Concept of the "Science for Policy Ecosystem" and Its Operational Usefulness

While the academic literature on the interface between science and policy is extensive, it remains of little help in describing the overall administrative and legal structure of the ecosystem for an entire country.
In France, the scientific literature on science for policy addresses, in particular, the definitions of the term "expertise" (referring, broadly, to formal expert input for public or other decision-making) and the ways in which it operates in specific areas of public action. Demortain[7] synthesized research on its role in public policy in France and identified four main approaches, or objects of study: technical bodies and administrations; the networks formed by those involved in providing expertise; the coexistence of multiple forms of knowledge, and the processes through which knowledge confers legitimacy; and the instruments used for evaluating public action. However, there is little literature focusing on specific advisory bodies. An older paper,[8] published in 1990, describes the modalities of the provision and use of scientific expertise in France at the time, and the beginnings of the Parliamentary Office for Scientific and Technological Assessment (OPECST, created in 1983), whose initial achievements are considered disappointing owing to its limited resources and its limited power to truly influence policies. The paper concludes that "public decisions are generally made in conditions of non-visibility and in a context that does not generate expert assessment procedures, because, within the strict technocratic tradition, it is the state that historically and fundamentally holds the monopoly on the capacity for legitimate expertise"

[1] D. B. Pedersen, R. Hvidtfeldt, *The Danish Eco-System of Science for Policy*, Copenhagen, 2021.
[2] V.C. Simões, *Science for Policy in Portugal*, Discussion Paper prepared for the workshop on Science for Policy across the EU: Portugal, organised by the European Commission's Joint Research Centre (JRC) and the Fundação para a Ciência e a Tecnologia (FCT), Portugal, 2021.
[3] S. Ladi, D. Panagiotatou and A. Angelou, *The Greek Ecosystem of Science for Policy*, Discussion Paper prepared for the workshop on Science for Policy across the EU: Greece organised by the Joint Research Centre of the European Commission and the General Secretariat of Coordination, Presidency of the Government, Hellenic Republic, 2021.
[4] R. Vilpišauskas, *Science for policy ecosystems in Lithuania,* Discussion Paper prepared for the workshop on *Science for policymaking in Lithuania,* organised by the European Commission's Joint Research Centre (JRC) and Vyriausybės Strateginės Analizės Centras (Strata), Lithuania, 2021.
[5] L. Maxim (auth.), K. Krieger, F. Melchor (eds), *L'expertise scientifique et l'éclairage des politiques publiques en France,* Luxembourg, 2023.
[6] L. Maxim (auth.), K. Krieger, F. Melchor (eds), *Scientific expertise and insights into public policy in France,* Luxembourg, 2024.
[7] D. Demortain, *Sociologia da ciência e da expertise*, in O. Porto De Oliveira, P. Hassenteufel (eds), *Sociologia política da ação pública*, Brasília, 2021, 153-173.
[8] C. Restier-Melleray, *Experts et expertise scientifique. Le cas de la France*, in *Revue Française de science politique*, 4, 1990, 564-585.

(p. 562). A more recent paper,[9] published in 2020, analyzes the overall structuring of science for policy in the field of public health, and concludes that the COVID-19 crisis has brought to light its inadequacy for managing such emergencies. Although an advisory organization, Santé Publique France, already had a mandate to address such situations, the President nonetheless made use of ad hoc scientific committees. According to the author of that paper, this is evidence of a dysfunctional advisory structure.

While there is extensive literature in STS concerning interfaces between science and policy, the abundance of definitions of scientific advisory activities[10] makes it hard to get a clear picture for a pragmatic and descriptive approach to the "system" as a whole. Similarly, the term "science for policy ecosystem" is quite broadly defined and is not, in itself, very operational. According to the European Commission's Joint Research Centre (JRC), the science for policy ecosystem is: "a complex of organisational structures and entities, processes, and networks that interact to support the mobilisation, acquisition, synthesis, translation, presentation for use, and application of scientific knowledge in policymaking processes".[11]

In parallel with STS work on the science–policy interface, the field of policy sciences has been working for a long time on Policy Advisory Systems (PAS), a concept introduced by Seymour-Ure in 1987.[12] PAS are defined as "the interlocking set of actors and organizations with unique configurations in each sector and jurisdiction that provides recommendations for action to policy-makers".[13] A substantial literature is currently available on PAS, in particular focusing on "Westminster countries"[14] (the UK, Canada, Australia, New Zealand). In their review of 30 years of research on these countries, Craft and Halligan focused on five advisory units to analyze PAS dynamics: public service and central agencies, partisan ministerial advisers, external consultants, commissions of inquiry, and select special advisory bodies. In particular, they show that the literature highlights the national specificities of PAS, connected to the administrative traditions of particular jurisdictions. While the dynamics of PAS are country-specific, two features nevertheless appear consistently: first, the general politicization of these systems, and second, the externalization of advice away from the public service and toward alternative advisory sources. These are synonymous with a process of deinstitutionalization,[15][16] consisting in the discontinuation of previously institutionalized advisory organizations or activity.

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[9] F. Calvo, *L'indépendance de l'expertise, gage de confiance*, in *Revue française des affaires sociales*, 4, 2020, 217-223.

[10] J. Lamy, *Gouverner par l'expertise scientifique et technique – note critique*, in *Cahiers Droit, Sciences & Technologies*, 8, 2019, 149-165.

[11] Online: https://knowledge4policy.ec.europa.eu/event/jrc-rtd-online-workshop-share-your-views-how-support-connect-policymaking-eu-member-states_en (last visited 08/03/2026).

[12] C. Seymour-Ure, *Institutionalization and informality in advisory systems,* in W. Polowden (ed.) *Advising the rulers*, Oxford, 1987, 175-184.

[13] J. Craft, J. Halligan, *Assessing 30 years of Westminster policy advisory system experience*, in *Policy Sciences*, 50, 2017, 47-62.

[14] J. Craft, J. Halligan, *op. cit.*, 48.

[15] A. Kay, C. Daugbjerg, *De-institutionalising governance? Instrument diversity and feed-back dynamics*, in *Asia Pacific Journal of Public Administration*, 37, 2015, 236-246.

[16] J. Fleicher, *Power resources of parliamentary executives: policy advice in the UK and Germany*, in *West European politics*, 32, 2009, 196-214.

To characterize the structure of PAS comparatively, Halligan[17] proposed a classification distinguishing between sources of advice based on their location relative to the state – those belonging to public service, those internal to government, and those external to government – and then dividing each of these categories in relation to the degree of government influence (Table 1).

Location	**Government influence**	
	High	**Low**
Public service	Senior departmental policy advisers; Central agency advisers/strategic policy unit	Statutory appointments in public service
Internal to government	Political advisory systems; Temporary advisory policy units: prime ministers' and ministers' offices; Parliaments (ex.: House of Commons)	Permanent advisory policy units; Statutory authorities; Legislatures (e.g., US Congress)
External to government	Private sector / NGOs on contract; Community organizations subject to government; Federal international organizations	Trade unions; interest groups; community groups; Confederal international communities / organizations

Table 1. Location of source of advice and degree of government influence[18]

Working with this classification, the literature notes that deinstitutionalization dynamics involve the decline of the public service as the primary source of advice, combined with a rise in the use of advisory units – both internal and external to government – particularly under the influence of the managerialist approach that became established from the 1980s onward. The particular advisory bodies that make up the PAS change over time according to the needs and priorities of different governments, and this change is particularly salient in the case of environmental advice.[19] The increase in the use of external consultants has also been recently noted in France, where a report by a senatorial committee of inquiry on the increasing influence of private consultants on public policies criticized this tendency, characterizing it as "tentacular" (that is, sprawling and far-reaching). In response to the question why decision-makers might prefer to use these private institutions instead of public expertise, including public research, the report answered that one of the main reasons was the speed of their response, especially in crisis situations that require strong and immediate political responses. Another of their advantages is the way their results are presented, which is adapted to the needs of the decision in question, and even guides it: their findings are often presented in the form of scenarios, highlighting their respective advantages and disadvantages, and even indicating the "best" option.[20]

[17] J. HALLIGAN, *Policy advice and the public sector*, in B. G. PETERS and D. SAVOIE (ed.), *Governance in a changing environment*, Montreal, 1995, 138-172.
[18] J. HALLIGAN, *op. cit.*
[19] J. CRAFT, J. HALLIGAN, *op. cit.*
[20] *Commission D'enquête Dédiée À L'influence Croissante Des Cabinets De Conseil Privés Sur Les Politiques Publiques*, *Un phénomène tentaculaire : l'influence croissante des cabinets de conseil sur les politiques publiques*, Paris, 2022.

Compared to the group of Westminster countries, the dynamics of PAS in European countries are less studied. For the French case, a conference paper presented the results of a comparison between its national internal advisory systems and those of Germany, Sweden, the Netherlands, and the UK.[21] Besides their differences, two tendencies could be observed across different countries: first, the attempt by governments to regulate advisory systems while still maintaining their independence, and second, the need to incorporate both knowledge and values to strengthen the legitimacy of policy. The authors showed that the institutional setup of PAS differs from one country to another in three main respects: configuration, administration, and composition. In these regards, France has a small and politically-oriented internal advisory system, with cabinets supporting the President and ministers, which are made up of personnel based on their ideological orientations. French law related to the regulation of the advisory system is detailed, the French government is not systematically obligated to respond to the advice given by the bodies in the internal system, and advisory bodies are publicly funded. In France, high-ranking officials, including internal advisers, are highly educated professionals interconnected through networks often formed during their student years. As in Germany and Sweden, the function of advisory activities is not only to provide knowledge, but also to create consensus among social actors.

While very rich, the literature on PAS does not address scientific advice in particular, but rather addresses all kinds of knowledge producers. Furthermore, little knowledge is available on the specific case of France.

3. The Structure of the French Ecosystem

In order to make the concept of a science for policy ecosystem operational for describing, as broadly as possible, the range of science for policy organizations and their relationships present in one national context (in this case, France), we developed an original method, taking legal status as the main criterion of classification. We assume that legal status significantly influences the procedures in force in these organizations, which in turn influences the role of scientific knowledge in decision-making. This hypothesis resonates with Halligan's,[22] who assumed that influence depends on the proximity of policy advice to government decision-makers. In the second part of this paper, based on previous work,[23] we discuss how procedures relate to the place of organizations within the ecosystem.

Given the wide range of organizations involved in developing scientific advice, we limited our study to two major areas of public action: the environment, including the public health risks associated with particular technologies, and agriculture. This choice is based on a second assumption: that the structure of the ecosystem is dependent on the topic to which it is related, such that, for example, military or energy-related science for policy organizations are different, at least in their legal bases, from those acting, for example, in the fields of social or environmental policies.

Legal status proved to be an effective operational criterion, allowing a clear distinction between different categories of organizations, and also allowing an exhaustive description of their tasks. The classification includes 12 classes of institutions:

[21] M. Schultz, D. Bressers, M. Van Steen, M. Van Twist, *Internal advisory systems in different political-administrative regimes*, in *International conference on public policy,* Milan, 2015.

[22] J. Halligan, *op. cit.*

[23] L. Maxim, *Influences on Scientific Advisory Work: The Case of Chemical Hazard Characterization*, in *Journal of Environmental Planning and Management*, 62, 2017, 229-247.

1. EPSTs (public scientific and technical research institutions)
2. EPICs (public industrial and commercial institutions), including two categories: "research" and "data"
3. Scientific, cultural, and professional public institutions, the *Grandes écoles*, and the National Museum of Natural History (MNHN)
4. Other state public administrative institutions and independent authorities
5. OPECST (the Parliamentary Office for Scientific and Technological Assessment)
6. Government departments
7. Academies
8. Associations under the 1901 Act tasked with providing support to public authorities
9. Agricultural technical institutes
10. Organizations with various legal statuses
11. Committees of experts working with the government and government departments
12. Organizations that mobilize scientific knowledge on an ad hoc basis

While legal status is useful for building this classification, four additional criteria can be used to characterize the relationship between science and policy within each of these classes:

1. The role in the science for policy interface of the producer, synthesizer, or broker of scientific knowledge (classifications adapted from Gluckman et al.).[24] According to Gluckman[25] and Pedersen & Hvidtfeldt:[26]
   - "Knowledge producers" are the institutions that produce scientific knowledge. Here, scientific knowledge includes national and international scientific publications, as well as data obtained using recognized scientific methods (e.g., national statistics, monitoring data, data produced by observatories, etc.), test reports produced by private research groups, technical reports[27] for regulatory purposes produced according to recognized scientific protocols (e.g., OECD standardized guides), and contributions made by professional scientists when they are heard by parliamentary committees of enquiry or interviewed by journalists, for example.
   - "Knowledge synthesizers" assess the available knowledge in order to extract a message about what it means.
   - "Knowledge brokers" translate scientific knowledge for the benefit of decision-makers and, conversely, help explain decision-maker requirements to scientists.
2. The origin of the request for work through this interface (referral and/or self-referral).
3. The legal resources available to the body undertaking the interface work, or in other words, the missions conferred on it by law, which may give it more or less capacity to access policymakers.

[24] P. D. GLUCKMAN, A. BARDSLEY, M. KAISER, *Brokerage at the science–policy interface: from conceptual framework to practical guidance,* in *Humanities and social sciences communic*ations, 8, 2021.
[25] P. D. GLUCKMAN, *The role of evidence and expertise in policy-making: the politics and practice of science advice*, in *Journal & Proceedings of the Royal Society of New South Wales*, 151, 2018, 91–101.
[26] D. B. PEDERSEN, R. HVIDTFELDT, *op. cit.*
[27] For example, risk assessment reports produced by consultancy firms/manufacturers for the marketing of plant protection products or other chemical products.

4. The stage in the public action life cycle, according to the characterization proposed by David Demortain: identification/definition of the problem, formulation/decision, implementation, evaluation (Table 2).

Table 2 presents the different categories of organizations, which are characterized according to the 10 dimensions used to describe the science-policy relationship. In the table, "+" indicates the presence of the respective characteristic in the organization's overall tasks, as defined by its legal status and practice.

This is based on the subjective assessment of the author of this paper, with the exception of four organizations for which the scores have been completed by their representatives (MNHN, INRAE, CIRAD, and Gustave Eiffel University). For example, an organization will be marked "+++" for "knowledge producer" if this is its main mission, as in the case of a research organization or university, or a single "+" if this function is present but not central to its missions. Similarly, an organization that is marked "++" for the criterion "problem identification/definition" is more involved in this stage of the public action life cycle than in any other stage. A "-" means that this particular function is not fulfilled at all by the organization in question.

The symbols attributed to each organization only very partially reflect the diversity within each category, and are essentially a means of discussing the relationship between each legal category and the decision-makers who use scientific knowledge.

It is also important to clarify that these scores characterize an organization's relationship with public policies only for the two selected policy areas (the environment and agriculture). Some organizations, such as the CNRS, produce knowledge in a wide range of disciplines and subjects. For this reason, a focus on another domain could lead to different scores (for example, the contribution of organizations to research policy or industrial policy).

The table and the representation of the science–policy interface with a spider diagram are inspired by the work of Pedersen and Hvidtfeldt,[28] who produced similar representations for the Danish ecosystem.

Roles/ organizations	Knowledge production	Knowledge synthesis	Knowledge brokerage	Referral	Self-referral	Legal resource	Problem identification	Formulation/ decision	Implementation	Evaluation
EPST	+++	+	+	++	+	++	++	+	+	+
EPST-INRAE	*+++*	*++*	*++*	*++*	*?*	*?*	*++*	*++*	*++*	*++*
EPIC research	+++	+++	++	+++	+	+++	++	++	+++	+
EPIC-CIRAD	*+++*	*++*	*++*	*++*	*+*	*+*	*++*	*++*	*++*	*++*
EPIC data	+++	+++	++	+++	+	+++	+	+	+++	++
Universities	+++	?	?	?	?	+	++	?	?	?
Gustave Eiffel	*+++*	*+++*	*+*	*++*	*+*	*+++*	*+*	*+*	*++*	*++*

[28] B. PEDERSEN, R. HVIDTFELDT, *op. cit.*

University										
Grandes écoles	+++	+	+	-	-	++	++	+	+	+
MNHN	+++	+++	++	+	+	+	++	++	+	++
Administrative public institutions	+	+++	+++	+++	+	+++	++	+++	+++	+++
OPECST	+	++	+++	+++	+++	+++	+++	+++	+++	+++
Government departments	++	++	+++	+++	+++	+++	+++	+++	+++	+++
Academies	-	++	++	+	++	+	++	+	-	-
Independent authorities	-	+++	+++	+++	+	+++	++	+++	+++	-
1901 Associations	++	++	++	+	+++	+	++	+	+	-
Agricultural technical institutes	++	-	-	+	++	+	+	+	-	-
Organizations with special status	+	+++	+++	+	+++	+	+++	++	+	-
Temporary expert committees	-	+++	+++	+++	-	+++	-	+++	+	++

Table 2. Categories of organizations and their functions for the science–public policy relationship

4. Main Components of the Ecosystem and Their Respective Roles Within It: A Descriptive Approach

The descriptive approach adopted below draws heavily on the work done by the author in 2022 and published by the JRC.[29]

1. *EPSTs (Public scientific and technical research institutions)*. Public scientific and technical research institutions are a category of public institution created in 1982, whose status is governed by the Research Code. Their missions include: the conduct and advancement of research in all areas of knowledge; the

[29] I warmly thank the JRC for their permission to use part of that work here.

exploitation of research results; the sharing and dissemination of scientific knowledge; and the development of expertise and training in and through research.
Examples of EPSTs include the National Centre for Scientific Research (CNRS), the National Research Institute for Agriculture, Food and the Environment (INRAE), the National Institute of Health and Medical Research (INSERM), and the National Research Institute for Sustainable Development (IRD).
Overall, EPSTs represent the bulk of the production of academic scientific knowledge in France, the performance of which is essentially measured in terms of the number and ranking of publications. They contribute to the "problem identification" stage of the public action life cycle, since scientific activity may reveal issues that subsequently require decision-making (e.g., the vast majority of environmental issues). The contribution of these institutions to the other stages is heterogeneous, with some organizations incorporating expert units that organize the production of collective expertise, which thus gives them a role in the formulation/decision and evaluation stages. For example, INRAE and CNRS have such units, which manage ad hoc expert committees.

2. *EPICs (Public industrial and commercial institutions)*: under the categories of either "research" or "data"
There are two possible legal regimes for a public institution in France: public administrative institution (EPA) and EPIC. They are distinguished by their activities: a public administrative service, in the case of EPAs, or a public industrial and commercial service, in the case of EPICs. The legal status of the two categories is different. Whereas an EPA is governed by public administrative law (its staff is made up of public officials, its decisions are administrative acts, and disputes are subject to administrative justice, with some exceptions), an EPIC is governed by private law (its staff members are subject to the Labor Code and are generally very similar to private sector employees, and the contracts it enters into with its users are governed by private law). EPICs are therefore public companies, their purpose being similar to that of a private company, i.e., to carry out an economic activity. Their financing is mainly derived from the activity in question, and their organization and operating methods differ from those of public administrative bodies.
Examples of EPICs include: the French Research Institute for Exploitation of the Sea (Ifremer), the French Atomic Energy and Alternative Energies Commission (CEA), the French National Radioactive Waste Management Agency (Andra), the Institute for Radiation Protection and Nuclear Safety (IRSN), the Agricultural Research Centre for International Development (CIRAD), the French Geological Survey (BRGM), the National Institute for Industrial Environment and Risks (Ineris), the Scientific and Technical Centre for Building (CSTB), the Indoor Air Quality Observatory, the Environment and Energy Management Agency (ADEME), and the National Forestry Office (ONF).
Most EPICs have research missions or activities (Ifremer, CEA, Andra, IRSN, CIRAD, BRGM, Ineris, CSTB), while others contribute to funding research (ADEME), or produce data in their field of expertise (ONF).
Within this group, two sub-groups can be identified: one made up of organizations with research missions, and another containing organizations that instead produce data.
While all EPICs are producers of knowledge, some are systematically called upon by the state in the day-to-day management of their field of competence (e.g., nuclear technologies, natural hazards, agricultural markets), and therefore have an important role as knowledge synthesizers. Compared to EPSTs, EPICs are more involved in the implementation stage of public policy (e.g., through the coordination of observatories, the development of reference tools and methods for regulatory implementation, or through state

support missions in crisis situations). In particular, what characterizes EPICs is their legal capacity to respond contractually to both state and private operators' requests, allowing them to accumulate knowledge of both categories of actors, which then becomes part of their overall skills base.

3. *Scientific, cultural and professional public institutions (EPCSCPs)* are public institutions whose constituent rules are set out in the Education Code. This status is specifically adapted to higher education institutions, and includes universities as well as some 50 other institutions, including engineering schools. The term EPCSCP was introduced in 1984 by a law known as the Savary Act, with the aim of designating a group of the most prestigious public institutions in the fields of research and higher education.
This category includes, in particular, the National Museum of Natural History (MNHN), universities, and the *Grandes écoles* – institutions that play a range of very different roles in decision-making.
The MNHN, which falls under the joint supervision of the ministers responsible for higher education, the environment, and research, responds to requests from the state or local authorities concerning the state of nature, its protection or restoration, and the land they manage. Its responses include the production of collective scientific expertise. Under the Environment Code, the MNHN is responsible for certain tasks such as the inventory of natural heritage and the adaptive management of hunted species, and it supports the French authorities in the context of certain multilateral environmental agreements.
Although they belong to the same legal category, universities and the MNHN are involved in expertise in different capacities. At least at first glance (but this would require confirmation from a dedicated survey), in universities it seems less common to find an institutionalized strategy regarding the provision of expertise to decision-making processes. Although policy advice is not clearly identifiable as an institutional strategy, it is common for lecturers and professors to act as expert advisors on an individual basis, especially as members of expert committees.
The *Grandes écoles* recruit their students through entry examinations and provide high-level education, including training for state engineers. A small number of the *Grandes écoles* are specifically designed to train and recruit senior members of the civil service, who go on to serve in ministries such as Justice, Health, and Defense. These include Mines ParisTech, Engref-AgroParisTech (National School of Rural Engineering, Water Resources and Forestry), the École polytechnique, the EHESP (School of Advanced Studies in Public Health), the ENS (École normale supérieure), etc.
As a result of their objectives, the *Grandes écoles* can be closer to decision-making, both through their alumni network and through the internships that their students can undertake in national government structures (ministries, etc.) or local and regional authorities. Internships can provide useful knowledge for decision-making, which can be linked to a form of expertise.

4. *Other public administrative institutions of the state and independent authorities* make up a heterogeneous category, in which different organizations can have different levels of tasks entrusted to them by the state.
Some examples of public administrative institutions (EPAs) are the French Biodiversity Office (OFB), the water agencies, the French National Agency for Food, Environmental and Occupational Health and Safety (ANSES), Santé Publique France, the National Agency for Territorial Cohesion (ANCT), the National Institute of Geographical and Forest Information (IGN), Météo France, the National Institute for Origin and

Quality (INAO), FranceAgriMer (the National Establishment for Agricultural and Sea Products), the Coastal Protection Agency, and the Nuclear Safety Authority (ASN).
Together with ministerial departments and OPECST, the state public institutions are at the heart of knowledge brokering, by virtue of their proximity to policymakers associated with their legal status. Knowledge brokering is central to their role, as these organizations are close to the government and interact with it on a regular basis. The roles of knowledge producer, synthesizer, and broker can also be combined within the same organization, as is the case with ANSES, which produces knowledge (in its research groups), synthesizes knowledge on certain subjects, brokers knowledge on others, and is also directly involved in decision-making (such as the market regulation of pesticides, for which it issues authorizations). The agency is therefore involved in several stages of the public action life cycle, ranging from problem identification (through its interaction with stakeholders and through its monitoring and research activities) to formulation (through syntheses on specific topics) and implementation (through its role in the implementation of European regulations such as REACH).

5. *OPECST, the Parliamentary Office for Scientific and Technological Assessment*, is one of the parliamentary delegations, which are permanent information and control bodies specializing in particular areas. As a parliamentary delegation, it provides parliamentarians with access to expertise independent of the government and – since it is not directly involved in legislative work – independent of the legislative process. OPECST was set up in 1983 with a mandate to "inform Parliament of the consequences of the choice of scientific and technological options, in particular, so as to enable it to make enlightened decisions"[30]. To this end, it gathers information, implements study programs, and carries out assessments. Its members are appointed in such a way as to ensure proportional representation of the political groups across both the National Assembly and the Senate. It is made up of 18 deputies and 18 senators. Matters may be referred to OPECST either by the Bureau of either assembly (on its own initiative, at the request of a president of a political group, or at the request of 60 deputies or 40 senators) or by a special or permanent committee. So far, the issues addressed by this body have been divided more or less equally between four main themes: energy, the environment, new technologies, and life sciences. A specific feature of OPECST concerns the powers given by law to its rapporteurs, which are identical to those of the special rapporteurs of the parliamentary finance committees. They can therefore carry out documentary and on-site inspections at all organizations under the authority of the state, and obtain all service documents, with the exception of those concerning national defense or state security.

6. *Government departments or directorates within ministries* are concerned with specific thematic areas. While they occupy a central place in the ecosystem, the understanding of their knowledge production, synthesis, and brokerage practices remains very limited and would greatly benefit from an in-depth investigation.
Examples include the Directorate-General for Risk Prevention (DGPR), the Directorate-General for Planning, Housing and Nature (DGALN), the Directorate-General for Energy and the Climate (DGEC), the General Commission for Sustainable Development (CGDD), the General Council for the Environment and

[30] https://www2.assemblee-nationale.fr/15/les-delegations-comite-et-office-parlementaire/office-parlementaire-d-evaluation-des-choix-scientifiques-et-technologiques/articles-caches/about-opecst (last visited 08/03/2026).

Sustainable Development (CGEDD), the Directorate-General for Education and Research (DGER), the Directorate-General for Food (DGAL), and the General Council for Food, Agriculture and Rural Areas (CGAAER).

7. *Academies* play an important role in conferring scientific legitimacy within the ecosystem of science–policy interfaces. They address societal questions of their own choosing, which they bring to political attention, sometimes in controversial situations. For our area of investigation, three academies are relevant: the National Academy of Medicine, the Academy of Sciences, and the Academy of Agriculture.

8. *Associations under the 1901 Act with missions to support public authorities* make up a heterogeneous category, with some of its organizations involved in drawing up standards (such as INRS – the French National Research and Safety Institute for the Prevention of Occupational Accidents and Diseases), while others aspire to the status of a professional scientific and technical reference center, such as ITSAP (Technical and Scientific Institute of Apiculture and Pollination).
The 1901 association status is legally characterized by the objective of non-profit activity, which makes these institutions dependent on the method of financing agreed between the partners involved in their establishment. Unlike other institutions in the ecosystem, 1901 associations do not have an administrative supervisory body (ministry etc.), although in some cases the state or local authorities may be involved as partners. Their funding may therefore be more volatile over time, and, as a consequence, so may their activity.

9. *Agricultural technical institutes* are organizations for applied research, technical support, experimentation, expertise, training, and information, specializing in agricultural sectors. They come together under the umbrella of the Agricultural Technical Coordination Association (ACTA), and form a network recognized by the public authorities.

10. *Organizations with various statuses* include public interest groups (e.g., the French Agency for the Development and Promotion of Organic Agriculture), foundations for scientific cooperation under private law (e.g., the Foundation for Research on Biodiversity), scientific interest groups (e.g., the Central Laboratory for Monitoring Air Quality), national botanical conservatories, and networks with no particular legal status, such as the Regional Groups of Climate Experts.

11. In addition to permanent organizations, a number of *temporary expert groups* advise the government, including, among many others:

- France Stratégie – an institution reporting to the Prime Minister, which "formulates recommendations to the executive power, organizes debates, conducts consultation exercises and conducts ex post evaluations of public policies"[31].
- The Commission on the Economy of Sustainable Development (CEDD), whose task is to inform the formulation and evaluation of public policies in the fields of environment, energy and climate, transport, and housing, in particular through the analysis of statistical data and economic analyses.

[31] https://www.casd.eu/en/project/france-strategies-studies/ (last visited 08/03/2026).

- The National Council for the Protection of Nature (CPCN), created in 2016, is a body of scientific and technical expertise, with competence in biodiversity protection and, more specifically, in the protection of species, habitats, geodiversity, and ecosystems. It gives its opinion on draft legislative and regulatory texts relating to its areas of competence.

12. Some organizations mobilize scientific knowledge on an ad hoc basis, such as Senate committees, which are working bodies specializing in the study of specific issues, or the standing committees of the National Assembly.
Other examples are the National Committee for Biodiversity (with an advisory role on biodiversity), the National Council for the Ecological Transition (a body for environmental social dialogue), and the National Water Committee (advising on water policies).

5. Some Insights Into the French Ecosystem

One of the first impressions that emerges from mapping the French science for policy ecosystem is the abundance of advisory organizations, some of which seem to deal with similar issues (for example, biodiversity or the energy performance of buildings), while having a diversity of legal statuses. Besides permanent organizations, ad hoc committees are often created to respond to specific crises and controversial situations. Their existence raises the question of why they are created, and what this implies about the role of already existing institutions in meeting political expectations. A reasonable question could therefore be: why is there such a diversity and abundance of organizations, and what kinds of decision-making needs do they serve?
A natural tendency to criticize bureaucracy could rapidly lead to a focus on redundancy in terms of the knowledge produced by different institutions on similar issues. An example of such an argument is the report by Girard et al.[32] on science for policy in public health, which concludes that the complexity of the dedicated system is "excessive", as it has been formed by the addition of "successive layers, without questioning the old ones". They argue that this complexity makes the functions of the different components confusing, the coordination of the whole unclear, and ultimately the mobilization of knowledge difficult, particularly in emergency situations.
However, an emphasis on redundancy and the inefficiencies of technocratic management might obscure the fact that the diversity of legal statuses and forms of organization corresponds to a diversity of working procedures, which can in turn correspond to a diversity of responses to various policy needs. Such specific needs become manifest in crisis situations, which are occasions on which existing scientific advisory bodies tend to transform, and new ones emerge. Because procedures significantly influence the results that can be produced, they are also the level at which science and policy become entwined in advisory work.
It is commonplace to analyze scientific advisory work by focusing on the knowledge that advisory bodies produce for decision-making, which starts from the assumption that the only thing that policymakers need for taking decisions is knowledge. This is of course a very narrow view.

[32] J-F. Girard, F. Lalande, L-R. Salmi, S. Le Bouler, L. Delannoy, *Rapport de la mission d'évaluation et d'expertise de la veille sanitaire en France*, Paris, 2006.

Advisory science may respond to very different political needs. Let us take the example of the "Asbestos committee", which has been well studied by social scientists in France: its role was not to produce knowledge but, on the contrary, to silence existing knowledge.[33] Other analyses point to the creation of ignorance, in particular to the role of advisory organizations in avoiding the consideration of particular issues – such as pesticide contamination – in decision-making.[34] Similar work shows how particular advisory bodies, such as the World Health Organization, can be infiltrated by industry lobbyists seeking to create doubt – the case of tobacco being a well-known example.[35,36] Advisory institutions also have their own political agenda and public image to manage, which influences their strategy of knowledge production – as shown for the EPA by Demortain[37] and Maxim, and for the FDA by Carpenter.[38] Demortain showed how the creation of the model of "risk assessment" at the United States Environmental Protection Agency was a response to contestation coming from both regulated industries and the public. In a recent publication,[39] I have shown how, again at the same agency, the concept of green chemistry responded to the need to renew the instruments for managing chemical risks in the United States, while being promoted by the agency as a "science". Similarly, advisory work based on socio-economic analysis plays the role of facilitating a co-management approach in the regulation of chemical risks in Europe.[40]

Indeed, for policymakers, scientific advisory activity can be an ambivalent resource, which can both be useful for displaying a legitimate basis for decisions related to scientific and technical questions, and have a boomerang effect when results are contrary to an intended political line. Having numerous advisory organizations to draw on can be an advantage, as their variety offers a corresponding variety of working procedures and opportunities to legitimate or, on the contrary, delay or avoid decisions. This variety therefore makes it possible to respond to very different policy-making needs: an urgent response in situations of crisis or, on the contrary, a means to buy time, de-escalate a controversial situation, and even "kick a decision into the long grass" (Clémenceau famously advised, "to bury a decision, create a commission"). Advisors can also provide knowledge that serves as an asset in negotiations with various partners, whether stakeholders concerned by a decision, the other Member States when policies are negotiated in the European Union, etc. Institutionalized advisory bodies, which therefore hold legal legitimacy, can serve to produce knowledge in response to knowledge produced by opposing or contestatory actors. Having a portfolio of opportunities to produce scientific knowledge thus becomes politically expedient. Pointing to the "redundancy" of advisory organizations overlooks the political essence of advisory science, by confusing it with academic science. Scientists can be found producing knowledge in research groups

[33] F. Chateauraynaud, D. Torny, *Les sombres précurseurs. Une sociologie pragmatique de l'alerte et du risque*, Paris, 1999.
[34] F. Dedieu, *Pesticides, le confort de l'ignorance*, Paris, 2022.
[35] P. Benkimoun, *L'Organisation Mondiale de la Santé et les lobbies*, in *Les Tribunes de la Santé*, 39, 2013, 49-55.
[36] D. Michaels, *Doubt is their product: how industry's assault on science threatens your health*. Oxford, 2008.
[37] D. Demortain, *The Science of Bureaucracy. Risk Decision-making and the US Environmental Protection Agency*. Cambridge, 2020.
[38] D. Carpenter, *Reputation and power. Organizational image and pharmaceutical regulation at the FDA*, Princeton and Oxford, 2010.
[39] L. Maxim, *The birth of green chemistry: a political history*, in *Science, technology and human values*, 50, 2024, 144-168.
[40] L. Maxim, *Economics and Power in EU Chemicals Policy and Regulation. Socio-economic analysis for managing risks*, cit.

("academic science"), in expert committees, and as employees in advisory organizations (e.g., agencies), and while all the kinds of knowledge they produce can be called "scientific", these vary significantly in their nature and their level of political content.

Scientific advisory activity is a source of authority, and thus a means of entering into the power game of social legitimation. As such, there is no way to separate science from values in science for policy, and any attempt at such separation only serves the interests of the group who draws that line.[41] In a similar vein, Jasanoff[42] argued that advisory committees are platforms for negotiating scientific and political conflicts using the codified language of technical choices.

Values and policy enter scientific advisory activities via procedural settings and working procedures. In a previous paper,[43] I distinguished between the two in the following terms: "procedural settings are rules for advisory activity, which are institutionalized through recommendations, guidelines, and formal or informal constraints on the advisory work", while working procedures are "the set of informal rules that experts use within a group in order to function together, producing common and coherent results."

Some examples of procedural settings are the processes of expert selection (including formal and informal criteria), the processes of formulating the questions to be asked of experts, the time frame and duration of the work, the financial resources allowed for it, the processes of accounting for conflicts of interest, the rules for organizing the collective work of the experts (in particular the degree of consensus required, and the way of dealing with minority opinions), the institutionalized methods for organizing the available evidence (e.g., systematic reviews, weight of evidence, uncertainty assessment, and communication), etc. Procedural settings lie outside the influence of the experts themselves or, at most, can be challenged only through considerable individual effort.

In addition to the institutionalized procedural settings, each expert group develops its own working procedures, which are informal rules that experts use within a group in order to function together and produce shared, coherent results. As with procedural settings, working procedures influence the results obtained. Such influences can be decisive enough to orient the results toward a finding of "risk" or "no risk" – for example, when the potential risk posed by a chemical substance is in question.[44] As each group establishes its own working procedures, these depend on the individuals who comprise that group, and can differ from one group to another. Such differences could be minor and have only a marginal influence on the results, or they could be significant and produce substantial effects. The combined effect of procedural settings and working procedures is that different scientific advisors could produce different scientific knowledge, or could use the existing scientific knowledge in different ways, leading to different results.

We have described the French ecosystem using legal status as the main criterion, which we assumed to be directly correlated with both legitimacy and the capacity to influence political decisions. For example, whereas, in the case of a health and environmental agency, scientific knowledge is legally embedded in ongoing regulatory activity (e.g., producing authorizations for the use of pesticides), in the case of collective expertise organized by research institutions results more often take the form of analyses, which may

[41] S. Cozzens, E. J. Woodhouse, *Science, Government and the Politics of Knowledge*, in S. Jasanoff, G.E. Markle, J.C. Petersen, T. Pinch (ed.), *Handbook of Science and Technology Studies*, Thousand Oaks, 1994, 533–553.
[42] S. Jasanoff, *The Fifth Branch: Science Advisers as Policymakers*, Cambridge, 1990.
[43] L. Maxim, *Procedural influences on Scientific Advisory Work: The Case of Chemical Hazard Characterization*, cit.
[44] A. Beroniuѕ, C. Ruden, H. Hakansson, A. Hanberg, *Risk to All or None? A Comparative Analysis of Controversies in the Health Risk Assessment of Bisphenol A*, in *Reproductive Toxicology*, 29, 2010.

or may not influence "business as usual" decision-making processes. However, our assumption should be examined and tested empirically: are advisory bodies whose legal statuses place them close to power called upon more by policymakers, and is their advice more consistently considered in decision-making than the advice of others, especially external consultants who have no such legal status? Do the legal statuses of such bodies reveal the prioritization of issues by public authorities? For example, can we consider that a temporary and relatively fragile legal status – such as those of associations under the 1901 law, foundations, scientific interest groups, and public interest groups – is a sign that there is less political interest in the issues addressed by these organizations (air pollution, biodiversity, organic farming, occupational health, etc.)? Which criteria determine decision-makers' choice of one advisory body or another, when the topic of interest is dealt with by several bodies?

A complementary research question would therefore be: can we conclude that the closer an organization is to power, the less autonomy it has in the answers it can provide? As discussed above, political values are built in to working and functioning procedures, which in turn influence the construction of knowledge in response to the question posed. What, then, is the real degree of autonomy exercised by scientists involved in advisory activities as experts, and by the advisory bodies themselves, in providing knowledge that they consider legitimate and of high quality for responding to the questions they are asked?

The STS literature has often addressed the question of which knowledge comes to be considered legitimate for mobilization in advisory activities, especially in controversial cases where scientific knowledge points to contradictory results, and where local health and environmental knowledge may be as relevant as scientific knowledge. In light of the concept of the science for policy ecosystem, these questions prompt an examination of the mechanisms of demand (policy) and response (from a provider of scientific knowledge). In the French case, these mechanisms appear at first glance to be functional and to respond to the government's priorities. However, the mechanisms for "inverse interactions" – those initiated by knowledge producers, without being invited by policymakers, and with the aim of seeing their knowledge incorporated in decision-making – seem to be much vaguer and to rest on a more uncertain legal status.

Overall, the question of (intentionally or involuntarily) "unsolicited" (but potentially relevant) knowledge is one of the central issues in conceptualizing the ecosystem. In light of this question, the descriptive work presented in this paper suffers from a major limitation: the fact that it does not take account of the place in the ecosystem of producers of scientific knowledge that are not formally and legally identified as advisory bodies. These are of many sorts, and have different objectives: external consultants, NGOs, think tanks, science-based lobby organizations, and scientific journalists. There is a need for further work to include these producers of knowledge in a broader definition of the science for policy ecosystem.