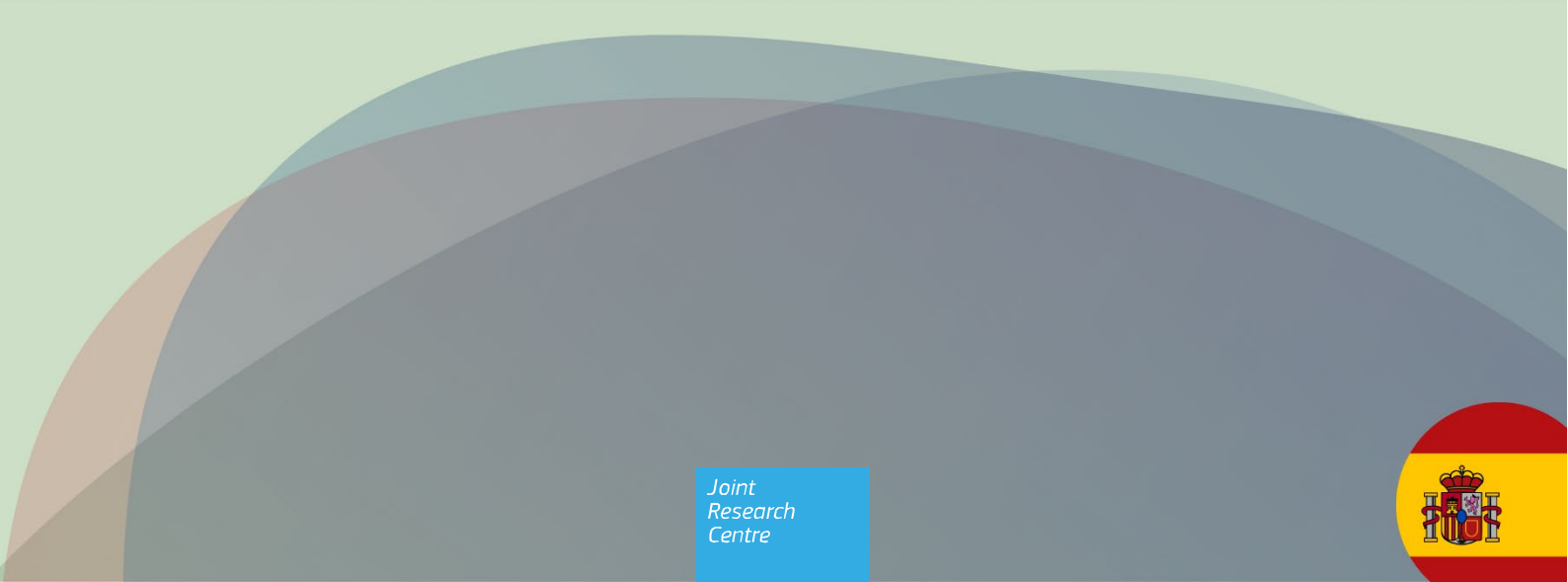
The Spanish scientific and technical advisory ecosystem for public policy

Final discussion paper

Cañibano, C.
Real-Dato, J.
Melchor Fernandez, L. (editor)
Krieger, K. (editor)

2024



This publication is an External Study report prepared for the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The contents of this publication do not necessarily reflect the position or opinion of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication. For information on the methodology and quality underlying the data used in this publication for which the source is neither Eurostat nor other Commission services, users should contact the referenced source. The designations employed and the presentation of material on the maps do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

This publication is an input to the "Strengthening and connecting ecosystems of science for policy across Europe" project by the JRC. It was prepared to stir up discussion during the 1-day workshop "Ciencia para las políticas públicas en España" (Science for policy in Spain). This event was held in Madrid on 21st September 2023 and was jointly organised by the JRC and the Spanish Ministry of Science and Innovation, with the collaboration of the Spanish Foundation for Science and Technology (FECYT), within the framework of the Spanish Presidency of the Council of the EU.

Disclaimer: The original publication of this report was made in Spanish and is available with the reference number JRC135017 in the JRC's Publication Repository. The original report was shortened and adapted to produce the current translated English version.

Authors' contact information
Name: Carolina Cañibano, PhD
Address: CSIC Office in Brussels, Rue de Trône 62, 1050, Brussels, Belgium.
Email: ccanibano@csic.es

Name: José Real-Dato, PhD
Address: Facultad de Derecho, Universidad de Almería, Carretera de Sacramento s/n, La Cañada de San Urbano, Almería, 04120, Spain.
Email: jreal@ual.es

Editors' information
Names: Lorenzo Melchor, PhD & Kristian Krieger, PhD
Address: The Joint Research Centre, Champ de Mars Building (CDMA), Rue du Champ de Mars 21, 1050 Brussels, Belgium.
Email: JRC-E4P-ECOSYSTEM@ec.europa.eu

EU Science Hub
https://joint-research-centre.ec.europa.eu

JRC135017

PDF ISBN 978-92-68-13771-0 doi:10.2760/452411 KJ-05-23-335-EN-N

Luxembourg: Publications Office of the European Union, 2024

© European Union, 2024

The reuse policy of the European Commission documents is implemented by the Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Unless otherwise noted, the reuse of this document is authorised under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (https://creativecommons.org/licenses/by/4.0/). This means that reuse is allowed provided appropriate credit is given and any changes are indicated. For any use or reproduction of photos or other material that is not owned by the European Union permission must be sought directly from the copyright holders.

All content © European Union, 2024, unless otherwise specified.

How to cite this report: European Commission, Joint Research Centre, Cañibano, C. and Real-Dato, J., *The Spanish scientific and technical advisory ecosystem for public policy*, Melchor Fernandez, L. and Krieger, K. editor(s), Publications Office of the European Union, Luxembourg, 2024, https://data.europa.eu/doi/10.2760/452411, JRC135017.

Contents

Abstract

This report is the first systematic analysis of the Spanish scientific and technical advisory ecosystem for policymaking. It analyses the mechanisms, institutions and stakeholders in Spain that contribute to integrating scientific and technical knowledge into the country's governance and addresses the effective use made of this knowledge. The analysis carried out suggests that there is indeed an emerging ecosystem of rich and diverse scientific and technical advice in which many interconnected stakeholders play a variety of roles and functions. The study highlights the relevant institutional and regulatory innovations of the last 3 years, which have integrated scientific and technical advice into the executive and legislative branches of the State. It is important, however, to bear in mind that the ecosystem is still fragile and has yet to overcome a number of important challenges, such as, inter alia, maintaining political momentum, training science advice specialists, creating additional governance and interface structures and promoting a stronger culture of use of scientific and technical knowledge in public organisations.

Keywords: science for policy, science-for-policy ecosystem, policy evaluation, science advice, Spain

Acknowledgements

The authors would like to thank Lorenzo Melchor and Kristian Krieger from the European Commission's Joint Research Centre for their trust and their work in providing feedback and editing the current report. They would also like to thank Ana Elorza and Izaskun Lacunza, from the Spanish Foundation for Science and Technology (FECYT), for the comments and input provided. We could have never obtained the qualitative information that was necessary for the writing of this report without the generous disposition and availability of the people we interviewed, to whom we also express our gratitude. Finally, we thank the Ministry of Science and Innovation and State Research Agency for the funding of the project CONESPOL – PUB (Impact of specialised knowledge and politization on the design and adoption of public policies in the higher levels of the Spanish State Administration, PGC2018-098319-B-C21). Some results from this project are presented in this report.

Authors

Dr Carolina Cañibano is a tenured scientist at the Spanish National Research Council (CSIC). She is currently detached at CSIC European representation office in Brussels. Her research lines include the study of research careers and scientific and technical human capital, with a special focus on gender analysis, and the study of research assessment systems. Since 2018 she has also worked in the follow up and collaboration with the Spanish association 'Science in Parliament' and the configuration of collaboration networks for the study of science advice in Spain.

Dr José Real-Dato is an associate professor of Political Science and Administration at the University of Almería (Spain). His research interests include how expert knowledge is incorporated into the public policy process. On this topic, he has directed the CONESPOL-PUB project (Impact of specialized knowledge and politicization at the higher levels of the Administration on the design and adoption of public policies in Spain, Ministry of Science and Innovation, 2019-2022) and is currently directing the PANCRAS-MAX project (Policy analytic capacities in regional public administration in Spain: mapping, assessing, and explaining, Department of University, Research and Innovation, Junta de Andalucía).

Editors

Dr Lorenzo Melchor and **Dr Kristian Krieger** both work as policy analysts at the Science for democracy and evidence-informed policymaking Unit, of the European Commission's Joint Research Centre (JRC). They are responsible for the analysis and capacity building of the institutional foundations of evidence-informed policymaking. They jointly lead and manage the JRC project on 'Strengthening and connecting ecosystems of science for policy across Europe', under which framework this current discussion paper and the 1-day workshop 'Ciencia para las políticas públicas en España' [Science for policy in Spain] have been developed.

Executive summary

This report is the first systematic analysis of the Spanish ecosystem of scientific advice in public policymaking. It analyses the mechanisms, institutions and stakeholders in Spain that contribute to integrating scientific and technical knowledge into the governance of the country, and addresses its effective use. The analysis shows that there is a rich and diverse scientific and technical advisory ecosystem, involving many interconnected stakeholders with a variety of roles and functions ranging from providing a framework to examine problems and political decisions to dealing with international projects, including evaluation, crisis management, foresight analysis and strategy.

Some features of this emerging ecosystem provide an interesting backdrop of opportunity for future consolidation and progression. They highlight the relevant institutional and regulatory innovations of recent years, since they have integrated scientific and technical advice into the structures of the executive and legislative branches of the State, and contributed to improving governance, fostering a culture of science for policy and ensuring Spain is part of the systems and networks of international scientific and foresight advisory bodies. These developments demonstrate the conscious commitment of the public administration and the political establishment to acquire the expert knowledge for designing public policies, as well as the commitment of the scientific community and institutions to share their knowledge and experience.

However, this context of opportunity should not overshadow the difficulties in institutionally consolidating the ecosystem. In addition to the complexities inherent in any national science-for-policy ecosystem that stem from the different epistemic regimes governing politics and science (different working times, working in different languages, different incentives, etc.), there are specific challenges:

1. Some of the most relevant initiatives that have only recently been introduced can only be strengthened by maintaining political momentum, regardless of government ideology or temporary changes in government priorities.
2. To move towards consolidation and anchor cultural change, it is essential to design additional governance and interface structures, which help to establish and nurture the connection between the existing expert knowledge in science and academia and the needs of public decision-makers.
3. The successful operation of additional structures would, inter alia, require specialised professionals with a knowledge of both science and policymaking. While there is high capacity in the public administration system and in science and academia, few stakeholders in the advisory ecosystem have specific competences for dialogue and knowledge exchange between science and policy, or to exercise responsibilities in science diplomacy.
4. Ensuring a progressive consolidation and reinforcement of a culture that attaches importance to incorporating scientific evidence and evaluation in making political decisions and designing public policies. There is a generally positive provision within the Spanish government towards improving the use of scientific evidence for policymaking. On the other hand, there is significant scope for improvement in policymakers embracing the benefits that scientific advice can have for policymaking, not only from the point of view of its legitimacy, but as a tool for its improvement.
5. Participation of society. Cultural change must also necessarily go hand in hand with the construction of collective intelligence in which society is actively involved. This not only involves considering the different social and economic interests at stake or the shared general social objectives in the advisory processes, but also incorporating the involvement of citizens, who can provide other types of evidence such as local knowledge or citizen expertise.

6. Improving data governance by government in order to facilitate access and reuse by citizens and the research community. Despite the progress made since the adoption of the Law on Transparency, Access to Information and Good Governance in 2013, there are still problems such as limits on accessing key data for diagnosing problems or evaluating policy, as well as the rigidity of data structures and formats, among others.

The challenges to be overcome are neither few nor straightforward, but neither were those that have been overcome for the emergence of what is already an ecosystem of institutions and stakeholders committed to making the most of scientific and technical knowledge in the field of public policy. Spain has the necessary background and a sufficient internal and European opportunity structure to take advantage of the efforts made. The consolidation and development of the scientific and technical advisory ecosystem will only benefit the functioning of our democracy and our international positioning.

1 Introduction

This report is an initial step in understanding Spanish 'civic epistemology'. For Jasanoff (2005, p. 255), civic epistemologies are an element of modern political culture and are rooted in the institutional practices through which a society values, assesses and deploys the knowledge that is used as the basis for collective choices. Miller (2008, p. 1896) defines civic epistemologies as social and institutional practices through which political communities build, review, validate and deliberate on politically relevant knowledge. The stakeholders generating and carrying civic epistemology belong to the citizenry or society at large, to the scientific, academic and expert community, and to the policymaking community. It is the dynamic interaction between these three groups of stakeholders that generates reliable and legitimate knowledge, and its translation, synthesis, validation or interpretation for use in political decision-making. This process is fundamental to the functioning of democracies (Jasanoff 2005).

Scientific advisory practices are those that mobilise scientific knowledge in support of the political decision-making process (Kenny et al. 2015) and are a key element of public policymaking. Science advice is considered essential given the complexity of the challenges facing our societies (OECD 2015, Pavone et al. 2023). Science advice informs policy decisions and forms the basis for global cooperation and science diplomacy in addressing policy challenges that transcend borders such as climate change, global health or the energy transition.

This report is the first comprehensive analysis of the Spanish scientific and technical advisory ecosystem for public policy. This ecosystem is made up of all the stakeholders and institutions that help to direct the available scientific and expert knowledge towards creating, implementing and evaluating public policies in our country. [1] The report is the fifth in the series of discussion papers, published by the European Commission's Joint Research Centre (JRC) as part of the project 'Strengthening and connecting ecosystems of science for policy across Europe'. [2] The analysis of the Spanish ecosystem follows a structure and methodology similar to the previous documents, albeit adapted to the particularities of the Spanish case.

Furthermore, the decentralised political configuration of Spain, where the regional authorities (Autonomous Communities) have powers in most of the main public policies (Colino, 2020), and the complexity of the resulting multiple ecosystems (national and regional/Autonomous Community) makes it necessary to limit the scope of this report to the state level, covering in particular the activities of the General Administration of the State (GAS) and the ministerial departments that make it up. The report will also address the connections of the scientific advice system with the Spanish Government and with the legislative power at state level.

The report consists of five sections:

- The current introduction.
- The second section presents the conceptual framework, which identifies the advisory functions and roles that are adopted by the stakeholders in their work, as well as the methodology used.
- The third section describes the Spanish science-for-policy ecosystem at the state level. Its main stakeholders are analysed, addressing the provision of advice to the GAS, the Presidency of the Government and the Congress of Deputies. Stakeholders directly linked to the academic/research system (e.g. public research organisations) are described as well as other stakeholders located within the boundaries of the scientific field and the politico-administrative field (e.g. *think tanks*). The sub-system for policy evaluation is also covered.
- The fourth section shows data on how scientific and technical knowledge is used by the senior management of the GAS and how they perceive their role and influence in the process of drafting and designing public policy in the central government.
- The fifth and last section presents a reflection on the existing challenges and opportunities for the consolidation and development of the Spanish scientific advisory ecosystem.

[1] In this report, we use the terms 'scientific and technical advisory ecosystem', 'scientific advisory ecosystem', 'expert advisory ecosystem', 'science-for-policy ecosystem' or 'advisory ecosystem' interchangeably.

[2] See https://europa.eu/!jW9NXq.

2 Conceptual framework and methodology

2.1 Conceptual framework: advisory functions and roles

For the definition of the roles and functions performed by each of the stakeholders in a scientific advisory ecosystem, we build on the conceptual framework proposed by Gluckman (2018). This author defines six functions to be performed in the science-policy interface and four roles associated with the exercise of these functions (Table 1).

Table 1. Functions and roles of the different actors in a science-for-policy ecosystem

Functions	1. Helping the policy community understand the systemic complexity of most problems 2. Helping policymakers see the range of options that could be applied and understanding the implications of each of those options 3. Supporting the policymaking community in the management of emergencies (environmental, health, natural disasters…) 5. Contribute to technological assessment and foresight 6. Contribute to science diplomacy
Roles	1. Knowledge generator 2. Knowledge synthesizer 3. Knowledge broker (capable of translating scientific and technical knowledge into a language that is accessible to the political and policymaking community) 4. Policy evaluator

Saurce: Based on Gluckman (2018)

Functions and roles can be linked together in so many different ways and each stakeholder has a unique way of combining the two to varying degrees of intensity. For example, a knowledge generator could help in the event of an emergency, or represent the government in an international organisation, as well as act as a policy evaluator if necessary and with the appropriate knowledge.

Pielke (2007) provides another categorisation of roles in the interaction between science and policy:

1. The 'pure scientist', who makes information or evidence available to the policy, without actually being involved in the transmission of the information or in the use that may be made of it;
2. The 'science arbiter', acting as a resource at the disposal of policymakers, providing information upon request and without any involvement in the policy decision;
3. The 'scientist activist' or 'science advocate', who seeks to steer the political decision towards a particular choice and;
4. The 'honest broker of policy alternatives', who offers possible policy alternatives and sometimes their possible effects, without conditioning the decision.

This model provides an interesting interpretative framework, but it is more difficult to apply than Gluckman's model to the analysis of documentary and qualitative information available for the current assessment. We will therefore use the Gluckman's framework to analyse the stakeholders in the Spanish ecosystem. However, this framework seems to underlie an assumption of neutrality of the stakeholders with regard to the policy option adopted, without considering the influence that the actor providing policy advice may wish to exert to guide decisions towards a certain direction. 'Activism' or influence on the part of the adviser to condition the policy decision, does find a place in Pielke's conceptual framework. For some stakeholders, we will see that this dimension is relevant.

2.2 Methodology

This analysis is based on the use of various information sources. Documentary analysis was used for section 3 on the mapping of stakeholders producing and providing advice and expert knowledge. In addition, we have conducted 14 in-depth interviews with senior staff from these organisations and with scientists who have advised through committees, intergovernmental bodies or in direct collaboration with a ministry.

We have also used information from the research project CONESPOL-PUB. [3] This project, carried out between 2019-2022, analyses the processes for using expert knowledge and scientific evidence within the General Administration of the State (GAS) [*Administración General del Estado*]. For section 3.3 on bodies with consulting and advisory functions (BCAFs), we used a database containing information on the GAS's BCAFs. For heading 4 on the perspective of public officials, the CONESPOL-PUB project provides the results of a survey of senior management and senior staff from each ministry.

[3] 'Impact of specialised knowledge on public policy design and adoption in Spain' (CONESPOL-PUB) (PGC2018-098319-B-C21). Funded by the Ministry of Science and Innovation/State Research Agency, under the State Plan for Scientific and Technical Research and Innovation 2017-2020 (call for proposals of 2018). Project research team: José Real-Dato (principal investigator, University of Almería), Miguel Jerez Mir (University of Granada), Cristina Moreno Martínez (University of Murcia), Alexandra Sojka (University of Carlos III of Madrid), Alberto Díaz Montiel (University of Granada), Manuela Ortega Ruiz (University of Jaén), Francisco Javier Alarcón González (University of Granada) and Adrián Megias (University of Murcia). The technical management of the survey was carried out by Esperanza Estévez Toledo (University of Almería).

3 Map of stakeholders for the Spanish science-for-policy ecosystem

3.1 Institutionalisation of science advice: new stakeholders and recent institutional changes

In 2015, Böhle and Muniz addressed, from a historical perspective, the characteristics of an emerging opportunity structure for the institutionalisation of scientific and technological advice in Spain, which had not yet been consolidated at the GAS level. They also identified changes in civil society which, combined with the emergence of new political parties and the increased maturity of the Spanish Science and Technology System (or Research and Development - R&D system), brought Spain closer to fulfilling the necessary conditions for this institutionalisation. According to Henen and Nierlieng (2014), these conditions were:

- the existence of a well-developed and differentiated R&D system;
- the firm commitment of the government and the parliament to provide the necessary structures and resources;
- a high level of political awareness among the political establishment and of commitment of the scientific community regarding the need to acquire and provide independent scientific knowledge for use in designing policies; and
- societal interest and demand for participating in policy decision-making related to science and technology.

Added to these requirements would be the presence of 'policy entrepreneurs' with the sufficient will to push for initiatives to institutionalise advisory services (Cruz-Castro and Sanz-Menéndez 2005).

The emerging opportunity structure, according to Böhle and Moniz, possibly paved the way for the *Ciencia en el Parlamento* (Science in Parliament) initiative to flourish in 2018 (Santillán García et al. 2021) and for several initiatives to institutionalise science and expert advice for public policies in Spain, all of which was fuelled by the impact of the COVID-19 pandemic on the social and political perception of science, and by the reforms stemming from the Recovery, Transformation and Resilience Plan (RTRP). These various initiatives are shaping a more consolidated and structured advisory ecosystem.

3.1.1 Institutionalisation in the executive: the National Office for Foresight and Strategy

The Spanish National Office for Foresight and Strategy (*Oficina de Prospectiva y Estrategia*) [(4)] was established in January 2020. Royal Decree 97/2023 of 13 February 2023 restructuring the Presidency of the Government, establishes that the National Office of Foresight and Strategy is responsible for analysing the challenges and opportunities Spain will face in the future and helping the country to prepare for them by designing innovative public policies and advising in the decision-making of the president and his ministers, as well as contributing to the development of European strategic autonomy (Official State Gazette of 14/02/2023). The Office has the rank of Secretariat General and has two analysis units with the rank of Sub-Directorate General.

The Office of Foresight and Strategy is different in many ways from the rest of the departments of the Office of the Prime Minister. Its team is multidisciplinary, working from a comprehensive vision of government action, and is in contact and collaborates with all of the Spanish government organisations. With a clear mandate to look to the future and the long term, it helps the government to extend the time horizon of its action and guides its decision-making. Its team comprises around 18 people, most of whom have a doctoral degree. This is an expert advisory unit integrated into the very structure of the Presidency of the Government.

It is worth highlighting the knowledge brokering role of this Office. It connects the Office of the Prime Minister with academic knowledge, as well as with expert staff and external stakeholders helping to address issues that either the Office of the Prime Minister or the Spanish government organisations request, or that the Office of Foresight and Strategy itself believes should be considered. This role distinguishes the National Office of Foresight and Strategy from the other units of the Office of the Prime

[(4)] See https://futuros.gob.es/.

Minister and the Spanish government organisations, which rely mainly on internal knowledge and are more focused on management and the short term. The Office works in collaboration with numerous national and foreign institutions and with academic and scientific staff.

Its team identifies relevant external expert knowledge and maintains a strong relationship with non-governmental think tanks and the foresight, policy planning or equivalent offices of the rest of the member states of the European Union with whom it works on joint projects, especially within the framework of the EU-wide Foresight Network. [5]

This Office does not have a defined method for gathering external knowledge or drafting documents, given the different formats and deadlines to which it works. Its products can range from a brief and quickly crafted note to address an urgent issue to a 700-page report such as that published in 2021 'España 2050' [Spain 2050], [6] which addresses multiple challenges for the country with the help of some 100 experts. The more complex a subject or broader a report is, and the more time it takes to produce it, the more the office engages with external stakeholders. The team itself assesses in each case the type of work and collaborations required.

The National Office of Foresight and Strategy specialises in giving the long-term view of the problems that the government is already addressing and the implications of various possible solutions. It also brings issues to the attention of the Cabinet of the Presidency that are not being sufficiently considered but are relevant in the medium to long term. Since its creation in 2020, it has been working in a context of pressing emergencies arising from the SARS-COV-19 pandemic, which it had to help manage.

The role of knowledge broker also extends to the work of intermediation and arbitration between the different ministries, when political action on an issue is sufficiently cross-cutting to involve several of them. The role of the Office in this context resembles the role of Pielke (2007)'s 'honest broker' by providing a cross-cutting and multidisciplinary vision on the issues, over the medium and long term, thus providing a better-informed picture of possible options for policy action and their effects. In addition to this brokerage function, it also plays the role of synthesiser of knowledge and, to a lesser extent because it is not an academic or research body, of generating knowledge within the government. Finally, it connects government action with society, making information available to the public in an informative format on socio-political issues such as the podcast series '2050: Construye tu futuro' [2050: Build your future] [7] and the book 'Imaginar un país' [Imagine a country]. [8]

3.1.2 Institutionalisation in the legislature: the Science and Technology Office of the Congress of Deputies

The Science and Technology Office of the Congress of Deputies, or Office C, [9] began work in March 2021 by means of an agreement between the Congress of Deputies and the Spanish Foundation for Science and Technology (FECYT). This consolidates an institutional entrepreneurship project, started in 2018 with the citizens' initiative 'Ciencia en el Parlamento' [Science in Parliament] (Santillan-García et al. 2021; Jurado 2022), whose leadership in the endeavour to set up a parliamentary science and technology advice office obtained an important commitment of the scientific community and the support of organisations such as FECYT and the COTEC Foundation. [10] This social and institutional support was key to the unanimous approval of the initiative in Congress, both by its presidency and by the parliamentary groups (Box 1).

Office C was established with the mission of promoting collaboration between the Congress of Deputies, the scientific community and society in addressing the legislative challenges that Spain is facing. Within the structure of Congress, this Office reports to the Directorate of Studies, Analyses and Publications (*Dirección de estudios, análisis y publicaciones*) of the General Secretariat of Congress, whose director and clerk at the Parliament is responsible for the mixed coordination of the office together with two

[5] More information: https://europa.eu/!dnQhGK.

[6] See https://www.lamoncloa.gob.es/presidente/actividades/Documents/2021/200521-Estrategia_Espana_2050.pdf.

[7] See https://futuros.gob.es/nuestro-trabajo/podcast.

[8] See https://futuros.gob.es/nuestro-trabajo/imaginar-un-pais.

[9] See https://www.oficinac.es.

[10] For further information, see Section 3.4.2.

FECYT coordinators. It also has a technical team comprising five people. Almost everyone in the team has a PhD.

Office C follows a 4-year strategic plan. Its function is to regularly inform the Bureau of the Congress of Deputies (*Mesa del Congreso de los Diputados*) of the state of knowledge on a number of topics. This is the first internal mechanism for Congress, with a focus on transparency, whose function of intermediation, contextualisation and synthesis of expert scientific knowledge is clearly professionalised, institutionalised and equally available to all parliamentary groups.

Office C has an Advisory Council where the main bodies of the Spanish science and technology system are represented. [(11)] The Advisory Council raises an initial series of issues that it considers relevant to be the subject of a report. Office C selects among these topics those that meet certain requirements, such as having a delimited scope suitable for a short report, sufficient evidence, potential to stimulate public debate, justified parliamentary relevance and projection in the medium or long term, and proposes them for the selection of the Bureau of Congress who takes the final decision. In 2022, four topics were selected: Green hydrogen as fuel; Artificial intelligence and health; Advances in cancer treatment and Cybersecurity. In 2023, six reports have also been produced.

Office C has established 'Method C' for its work. Each report of evidence is drawn up on the basis of scientific literature and interaction with numerous experts, adopting a multidisciplinary approach and situated in the Spanish socio-political context. Each report is subject to successive reviews in interaction with interviewed experts. Once a collection of reports is complete, a public presentation event and a series of closed meetings, known as 'C dialogues', are organised, bringing together MPs and scientists to discuss the various topics covered.

Office C is the first institutional structure of scientific and technical advice to the Spanish parliament and occupies a key position in the Spanish science-for-policy ecosystem. With its reports, it exercises the roles of *knowledge synthesiser* and *broker* and facilitates the systemic and multidisciplinary understanding of complex problems by providing synthesised and structured scientific evidence to legislators (Gluckman's first function, Table 1). It shapes and raises awareness of the importance of science advice and improves the connection between the scientific and political community, through its pairing scheme between MEPs and scientists and its student traineeship programme. By enlisting the expert knowledge of various social partners for its reports, Office C connects the experience and knowledge of citizens with the evidence provided by the scientific community and Parliament's legislative activities. It thus exercises a systemic role within the national ecosystem for scientific advice on public policy, while connecting Spain with abroad, through the network of European Parliamentary Technology Assessment (EPTA), in which the Congress joined in November 2021.

Box 1. Science in Parliament

In 2018, a small group of 'institutional entrepreneurs', consisting of scientists and science managers and communicators, founded the Science in Parliament association (*Ciencia en el Parlamento*, CeeP). CeeP is defined as a citizens' initiative created with the aim of contributing to the establishment of a parliamentary office for scientific and technological advice (Santillan-García et al. 2021).

Its promoters were motivated by the desire to contribute to society beyond the conventional limits of the dissemination of scientific knowledge. The association received support from key institutions, including the Presidency of the Congress of Deputies, FECYT and the COTEC Foundation. Social media was essential in the dissemination and delivery of support (Jurado 2022).

In January 2018, the association opened its Twitter account, currently with 12 000 followers. In summer 2018, it organised training on scientific advice and parliamentary functioning for a group of scientists working together with the initiative to simulate the role of an advisory office. In November 2018, it held two sessions in Congress to present the potential of an office and its objectives. Shortly afterwards, the President and Bureau of the Congress, together with the Minister of Science and Innovation, committed to creating the Office of Science and Technology of the Spanish Congress of Deputies (Cañibano 2023). After three parliamentary terms, a pandemic and the presentation of a comparative report on other parliamentary offices prepared by CeeP, Office C started its journey in March 2021.

[(11)] See https://www.oficinac.es/consejo-asesor.

Today, having achieved what was originally its central goal, CeeP remains a key part of the Spanish scientific advisory ecosystem. It is part of the Advisory Council of Office C and carries out training and awareness-raising activities, such as pairing schemes between scientists and politicians.

3.1.3 Legislative and regulatory developments (2022-2023)

In addition to the creation of these internal structures for the General Administration of the State (GAS) and the Congress of Deputies, cultural change and the emergence of a more structured science-for-policy ecosystem have been significantly boosted by several legislative initiatives and regulatory plans approved in the last 2 years.

The Law on Science, Technology and Innovation (LSTI)

The Law on Science, Technology and Innovation (LSTI), which amends the previous Law of 2011, entered into force in September 2022. Its objectives include promoting the transfer of knowledge between the stakeholders in the Spanish Science, Technology and Innovation System (SECTI) and promoting innovation in the public sector, which involves designing evidence-based interventions, scientific evidence in particular (Official State Gazette of 6/09/22, p. 15). Based on these two objectives, a new feature of this Law is the emphasis on the importance of transferring scientific evidence to the design processes of innovative public policy interventions. Although the Law does not provide for specific bodies to support this transfer, which will be covered by the subsequent Transfer and Collaboration Plan, it does establish conditions in the SECTI that incentivise these activities.

Article 17 on 'mobility of research staff' provides that the secondment of research staff providing services to public sector agents, other national or international public or private stakeholders may be authorised, while maintaining the employment relationship with the origin institution. It also provides for the possible granting of compatibility for the exercise of scientific or technical advice activities, as well as the granting of temporary leave to join other SECTI stakeholders. Article 19 provides for temporary (full-time or part-time) secondment to SECTI public funding agents, of research or technical staff and specialists in the field of research, experimental development and innovation. Thus, the LSTI provides for the mobility and collaboration of public sector research staff with other GAS staff to carry out expert advice activities under different modalities.

The LSTI also stresses the need to adapt and update the criteria for the assessment of the merits and career of research staff, taking into account actions for valorisation and transfer of scientific knowledge, including science advice. The Law stresses the dimension of 'valorisation' (Article 35 bis), which goes beyond the concept of 'transfer' and incorporates society as a whole and particularly the public sector as beneficiaries of the results of scientific research.

Transfer and Collaboration Plan: science and innovation at the service of society

In December 2022, the Government approved the Transfer and Collaboration Plan, [(12)] with a set of measures to accompany the LSTI and the draft Organic Law on the University System, as well as to strengthen RTRP actions. It aims to foster interactions and knowledge flows within the SECTI, in order to strengthen its cohesion. The Plan consists of 15 key measures structured in three main areas of action: knowledge transfer; public-private partnerships for innovation; and ecosystem capacity-building and development.

The first area focuses on the transfer of knowledge generated by the public research system to businesses, the public sector and society. One of its four measures is to encourage science advice to the public sector, so that this knowledge can inform and enrich political decision-making, public policy articulation, and legislative and regulatory production (MCIN 2022, p. 17). The Plan envisages strengthening the Science and Technology Office of the Congress of Deputies, extending the model of Office C to other areas of public administration (AAPP) and state powers, and improving science advice systems in crisis situations, as well as introducing new complementary formal and informal scientific advice mechanisms (MCIN 2022, p. 18). The Plan also seeks to incentivise the recognition of scientific advisory activities in the evaluation processes of public sector research staff. For example, an activity deserving recognition was the pilot call for the 'knowledge transfer reward' [*Sexenio de Transferencia*] in

[(12)] https://www.lamoncloa.gob.es/consejodeministros/resumenes/Documents/2022/201222_Plan_Transferencia_Colaboracion.pdf.

2018. Following the contracting by ANECA [13] of two external advisory studies on the results of this call (Bustelo, Salido et al. 2021, Castro et al. 2022), the initiative is now under review.

Law for the Institutionalisation of evaluation of public policy in the Central State Administration

Also in December 2022, Law 27/2022 on the institutionalisation of evaluation of public policy in the Central State Administration was approved. The Law forms part of the commitment to modernise the public administrations to strengthen the public system for their evaluation, undertaken within the framework of the RTRP. Its aim is to 'institutionalise evaluation as a tool for collective and organisational learning, improvement of public service and accountability and transparency, contributing to the effectiveness and efficiency of public action' (Official State Gazette of 21/12/2022, p. 5).

The Law highlights the experience of the Independent Fiscal Responsibility Authority, AIReF, in charge of ex-post evaluations of public spending review, which are fundamental within the RTRP. However, it also states that the practice of policy evaluation in the GAS is sporadic, dispersed and without uniform criteria. Thus, the Law promotes institutionalising this practice, with a shared and specific methodology in the planning of public policy. The Law notes that this change of perspective implies a 'cultural change' and is part of a more ambitious project to optimise the decision-making process and boost innovation in the public sector, based on evidence and learning. The institutionalisation of the evaluation passes through the State Agency for the Evaluation of Public Policy, whose functions and purposes are defined by the Law of 2022. Provision is made for the creation of a Higher Evaluation Commission, with a consultative and expert advice role, and a Public Policy Evaluation Coordination Unit in each ministry to facilitate inter-ministerial collaboration and coordination on evaluation, including the coordinated development of a system of indicators and databases to which evaluators may have access. According to Varela Merino (2023, 40), 'this Law will make it possible to strengthen and provide stability and quality to the evaluation of public policy' in Spain by 'creating an autonomous body' that brings together knowledge 'in the field of evaluation and reinforces ex ante evaluation'.

Fourth Open Government Plan of Spain

January 2023 saw the presentation of a revision of Spain's Fourth Open Government Plan 2020-2024, [14] initially approved in October 2020 by the Open Government Forum, composed of representatives of the public administrations and civil society organisations. The Plan is structured around four broad Open Government objectives: (1) transparency and accountability; (2) citizen participation; (3) public integrity; and (4) awareness-raising and training. It contains 10 commitments resulting from proposals from citizens and civil society, including improving citizens' participation in the design, implementation and evaluation of public plans and programmes, through advisory bodies and various media, including digital media.

The Directorate-General for Public Governance of the Ministry of Finance and Public Service is responsible for coordinating the actions of the Plan, which for the first time incorporates all three levels of public administrations. Both the design and implementation of the plan incorporate the scientific and academic community through their participation in the Open Government Forum, which has 12 members which either hold a university professorship or are a member of the Academy of Moral and Political Sciences. Scientific and academic professionals also collaborate with this Directorate-General through their participation in working groups related to the Open Government. The design and implementation of the Open Government Plans are an important element of the ecosystem of connecting public policy with civil society, including the scientific community. This connection is also expected to increase as, for the design of the Fifth Open Government Plan, greater coordination between the government's data opening policy and the public governance policy is envisaged.

Organic Law on the University System (OLUS)

In April 2023, Organic Law 2/2023 on the University System, known as the OLUS (LOSU in Spanish), entered into force, updating the previous Law of 2001. The OLUS emphasises the need to promote a university system at the service of society as a whole and committed to open science and citizen science, where knowledge is built in a participatory and collaborative manner and made available to society

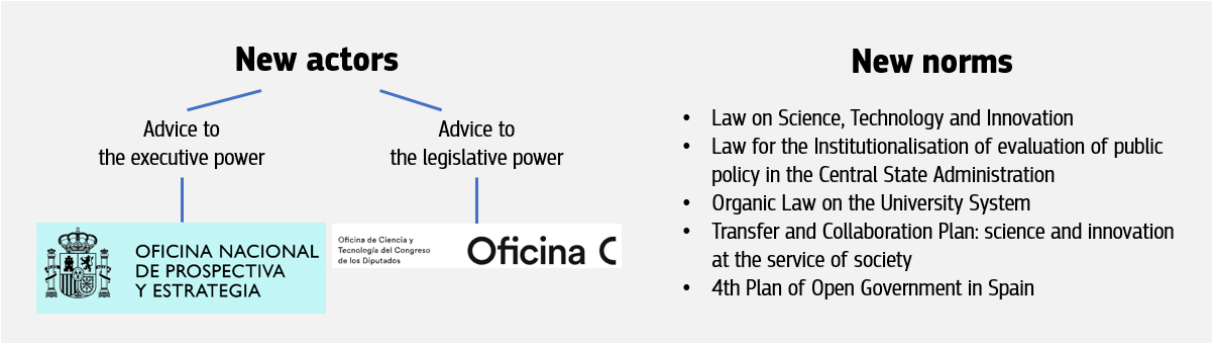
[13] See National Agency for Quality Assessment and Accreditation https://www.aneca.es/.

[14] https://transparencia.gob.es/transparencia/transparencia_Home/index/Gobierno-abierto/planes-accion/documentos_IVPlan.html.

through various channels. Article 60 provides for the collaboration of the university community with public (and private) entities in order to carry out work of various kinds. Furthermore, Article 66 authorises the temporary affiliation of teaching and research staff to other SECTI public centres, while maintaining their attachment to the university of membership. In this regard, the OLUS establishes operating principles that include the University's collaboration with public administrations or legislators to support the design, implementation or evaluation of policy, through the establishment of agreements or other mechanisms. Although, unlike the previous regulatory texts, there is no express reference to science advice to public administrations as a relevant mechanism, subject to regulation in university governance.

We began this section on institutional and legislative developments by referring to the conditions that, according to Henen and Nierling (2015), need to be met in order for a scientific and technological advisory structure to be institutionalised in a country in the process of formulating, implementing and evaluating public policy. What has happened in Spain in the last 3 years leaves no doubt as to the effective fulfilment of these conditions. Spain has a well-developed R&D&I system; the newly created structures and bodies show the commitment of the government and parliament to promote scientific and expert advice and to provide the necessary resources; this is the result of the awareness and commitment of an important part of the political establishment and the scientific community; and there is an ostensible interest in society to participate in policymaking and in political decision-making processes. All this lays the foundations for enriching relations between knowledge producing and transmitting stakeholders and public administrations. Graphic 1 summarises these developments and section 3.2 analyses the role of scientific and academic stakeholders in the scientific advisory ecosystem.

Graphic 1. Institutional novelties in the science-for-policy ecosystem 2020-2023



Source: Own elaboration

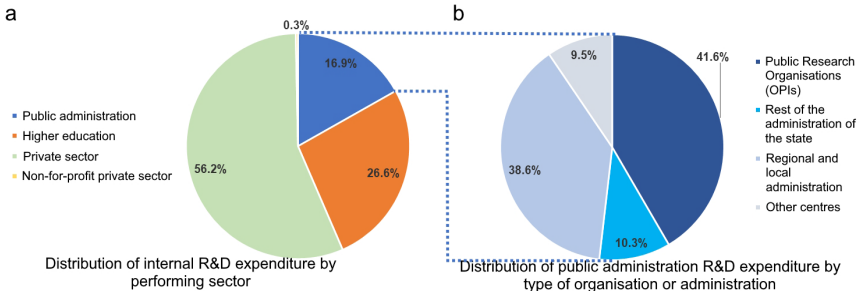
3.2 Scientific and academic stakeholders

3.2.1 Public administration's research performing organisations

According to data from the National Statistical Institute (Instituto Nacional de Estadística, INE) on Research and Development (R&D) from 2021, [15] there are 468 bodies carrying out in-house R&D in Spanish public administrations, including the public research performing organisations of the GAS, organisations in the rest of the state administration, those of the regional and local authorities and other centres. Together, these entities implement 17% of domestic R&D expenditure in the country, compared to 56% of the business sector and 26% of higher education (Figure 1a). The capacity of Spanish public administration to internally generate expert scientific knowledge is therefore significant and distributed geographically and between different types of research performing organisations. GAS public research performing organisations execute 41% of the total government R&D expenditure (Figure 1b), and we focus on them below.

[15] INE (2023) Number of bodies performing internal R&D by type of administration (https://www.ine.es/jaxi/Datos.htm?tpx=54638, accessed 02/09/2023).

Figure 1. Distribution of internal R&D expenditure by performing sector (a) and distribution of public administration R&D expenditure by type of organisation or administration (b)



Source: Own elaboration using data from the National Institute of Statistics [*Instituto Nacional de Estadística*, INE] (2021)

3.2.2 The public research performing organisations of the General Administration of the State (OPIs)

The Science Law 17/2022 in force, in Article 47, designates Public Research Performing Organisations (RPOs known as OPIs in Spanish) as those created to directly conduct scientific and technical research activities, provide technological services, and perform other complementary activities necessary for the scientific and technological development of society. The Spanish National Research Council (CSIC), the National Institute of Aerospace Technique (INTA), the Carlos III Health Institute (ISCIII), the Centre for Energy, Environmental and Technological Research (CIEMAT) and the Canary Islands Institute of Astrophysics (IAC) (Table 2) are all public research performing organisations of the Central State Administration (OPIs). In 2021, in accordance with the provisions of Royal Decree 202/2021, three research centres which had hitherto been OPIs were assimilated by the CSIC as National Centres: the Spanish Institute of Oceanography (IEO), the National Institute of Agricultural and Food Research and Technology (INIA) and the Spanish Geological and Mining Institute (IGME).

With the exception of the CSIC and the IAC, the other OPIs, including those recently integrated into the CSIC as National Centres, were specifically created to provide qualified knowledge and technical assistance to the Spanish ministries from which they were ascribed, in sectors where scientific research, experimentation and technological development were deemed necessary (López Facal and Represa Sánchez 1998). The need for public administrations to receive scientific and expert advice and to build on the results of the research is therefore at the very origin of some Spanish OPIs.

Table 2. Public research performing organisations in Spain (OPIs)

Name	Abbreviation	Year of foundation	Ministry of organic adscription	Ministry of functional adscription
Spanish National Research Council	CSIC	1939	Science and Innovation	Science and Innovation
Centre for Energy, Environmental and Technological Research	CIEMAT	1964	Science and Innovation	Ecological Transition and Demographic Challenge
National Institute of Aerospace Technique	INTA	1942	Defence	Defence
Carlos III Health Institute	ISCIII	1986	Science and Innovation	Health, Consumer Affairs
Canary Islands Institute of Astrophysics	IAC	1982	Science and Innovation	Science and Innovation

Source: Own elaboration from López Facal and Represa Sánchez, 1998.

The expenditure implemented by CSIC in 2022 represents 85% of the total internal expenditure in R&D of the OPIs recorded by the INE for 2021. CSIC research staff (5 823 in 2022, including research staff in training) represent 72% of the research staff employed at the OPIs, according to the INE in 2021. [16]

[16] We compare the data provided in the 2022 CSIC Annual Report with the latest data available from the R&D statistics, which correspond to 2021. We consider this preferable to using data from the 2021 CSIC, as the integration of the

Unlike the other OPIs, which are attached to a specific scientific or socio-economic sector, CSIC is multi-sectoral and multi-disciplinary, being the largest public organisation in Spain dedicated to scientific research. The following section focuses on their role in the advisory ecosystem.

3.2.3 The Spanish National Research Council (CSIC)

The CSIC is the largest of the OPIs with 121 research institutes and three national centres, spread throughout Spain. It employs more than 13 800 people, with more than 4 400 research staff. In 2021, the CSIC Statute was amended with the integration of the three National Centres (IEO, IGME, INIA). In addition to the functions which it had hitherto assumed, such as carrying out scientific and technological research, training of teams, managing scientific and technical infrastructure or promoting scientific culture, etc., the CSIC was expressly assigned the role of 'informing, assisting and advising public and private entities on science and technology, in accordance with the principles of financial sufficiency, impartiality, independence and confidentiality'. It is thus established that the CSIC must provide assistance to the AGE by:

- Participating in designing, evaluating, and executing scientific and technological policies determined by the overseeing Ministry;
- Providing services by the national reference laboratory or similar national authority;
- Representing the State in national or foreign entities and organisations linked to scientific and technical research;
- Contributing to the definition of public policy to prevent or mitigate natural disasters and other national emergency situations; and
- Carrying out the actions entrusted to it by the Spanish government organisations responsible for implementing government policies relating to agricultural and food research and technology and the protection of the environment, oceanography, fisheries and the marine environment; and earth science and technology (Official State Gazette of 31/03/2021).

In the IEO, IGME and INIA, since their creation and by their very nature, there has been a culture of close relations with the public administrations. Their integration into the CSIC coincided with the upheavals caused by the SARS-COV-19 pandemic (2020-2022), the eruption of the volcano on the Island of La Palma (2021), and other environmental crises such as those in the Mar Menor and Doñana. The knowledge generated by the CSIC has been key in tackling these crises, facilitating greater collective and institutional awareness of the importance of establishing formal channels for connecting the CSIC with the public administrations and with the rest of society. This collective awareness is also about the practice of advising the administrations run by many CSIC researchers, who are directly contacted individually by the administrations and Parliament.

The perception of the current governing team [17] of the CSIC is that a good number of researchers in the institution advise all levels of government (local, regional, national and international). For example, the number of recent enquiries received related to cybersecurity, artificial intelligence and environmental issues, from various ministries and from parliament, is noteworthy. However, the perception is that there are no tools to monitor this work, nor sufficient institutional mechanisms to structure it. Moreover, researchers themselves often downplay the importance of this type of work when communicating it to the institution or assessing their merits since the existing research assessment framework does not particularly value it.

To address these weaknesses, the CSIC has initiated a series of activities, which form part of the transition to an institutional culture that gives greater priority to the provision of understandable, organised, reliable and accessible scientific evidence to the public authorities:

- The Cicero Itineraries: a recent initiative that, since March 2023, selects themes aligned with the pillars of the European objective of Strategic Autonomy (health, digital, food and energy) to organise

National Centres took place in April and therefore this year's data combines two periods in which the size of the CSIC differs significantly.

[17] The current CSIC governing team, with which an interview was held prior to the drafting of this report, took over the management of the institution in June 2022.

events inviting politicians, entrepreneurs and journalists to visit the CSIC and learn about its research on a specific challenge of scientific, political and socio-economic relevance. To date, three meetings have been held on (1) resistance to antibiotics, (2) the Mediterranean diet in the context of climate change, and (3) green energy.

— The 'Science for Public Policy' collection: the first eight reports published within this collection were presented on 28 June 2023, [18] with the aim of contributing to defining evidence-informed policies. The reports are addressed to the public administrations and to society in general, summarising the issues that pose a specific challenge such as forest fires or the management of plastics and elaborate on the lines of research that the CSIC has in place to address them. The collection will be expanded on the basis of proposals made by the research staff for the drafting of new reports.

— The preparation of an Emergency Action Protocol: this initiative stems from the commitment made with the Government of Spain to assist in emergencies. The Protocol envisages improving the CSIC's response and action during crises such as those recently experienced.

It is worth mentioning the creation of structures for interdisciplinary collaboration between centres and connecting with the rest of society, promoted since 2018. These structures provide the CSIC with greater flexibility and responsiveness to specific social needs, such as the SARS-COV-19 pandemic:

— Interdisciplinary Thematic Platforms (PTIs): Launched in 2018, the PTIs bring together research groups from different CSIC sites to address scientific challenges with important social implications, which require a multidisciplinary approach and collaboration with other social stakeholders. These are flexible, open and connected structures with citizens and the business sector, offering opportunities for collaboration and potentially for scientific advice. Currently, 24 PTIs are active on topics such as ocean sustainability, energy transition, global health or urban mobility. [19]

— CSIC Hubs: [20] seek multidisciplinary and inter-centre collaboration to foster group collaboration, visibility of research on various topics and the connection with external stakeholders, including public administrations.

These initiatives show how, progressively and especially after the integration of the National Centres, the CSIC has been taking on more functions and roles in the national scientific advisory ecosystem. It has evolved from being a knowledge *generator* to assuming an explicit role as a *synthesiser* (with the publication of thematic reports) and even as a *broker,* through new structures and activities linking research and policy (PTIs and Cicero Itineraries). CSIC also collaborates with the GAS in the field of *policy evaluation* of public actions when required by public administrations (as in the IEO's annual assessments of the state of marine species). The CSIC performs, with varying degrees of intensity, the four roles and six functions envisaged by Gluckman (2018). It is worth highlighting its support for *tackling emergencies* and delivering *science diplomacy*, through representation of the government in several intergovernmental bodies where decisions are taken that are often binding on Spain, as well as in international non-governmental organisations, which prepare reports for political decision-making.

The consolidation of the CSIC's tendency to play an increasingly active and diverse role in the national scientific advice ecosystem would, according to some of its researchers, result in the establishment of a culture of knowledge valorisation that gives real recognition to advice, synthesis and broker of knowledge towards public policy, in the context of evaluation and research assessment processes. It would also involve an improvement in the training of research staff in the performance of these tasks and in the exercise of science diplomacy.

3.2.4 Other public research performing organisations

The remaining OPIs have a much smaller volume than the CSIC (both in budget and in staff) and a more limited territorial or sectoral scope, but were expressly created to assist the government in decision-making and policy design by providing services and scientific-technical knowledge.

[18] Available at: https://digital.csic.es (accessed 02/09/2023).

[19] CSIC (2023) Interdisciplinary Thematic Platforms (PTIs) (https://www.csic.es/es/investigacion/plataformas-tematicas-interdisciplinares, accessed 02/09/20239

[20] CSIC (2023) CSIC Hubs(https://www.csic.es/es/investigacion/conexiones-csic-y-libros-blancos-desafios-2030/conexiones-csic, consultada 02/09/2023)

The National Institute of Aerospace Technology (INTA) is attached to the Ministry of Defence, instead of the Ministry of Science and Innovation as the other OPIs. It employs approximately 1 500 people, carries out scientific and technical research activities and provides technological services. It specialises in research and technological development in the fields of aerospace, aeronautics, hydrodynamics, and defence and security technologies. In addition to scientific and technical research and training, its functions include technical advice and the provision of technological services to the Ministry of Defence and the public administrations on request. It also acts as a metrological laboratory of the Ministry of Defence and as a laboratory, technological centre and technical service for the armed forces and other bodies. It is responsible for the certification of defence equipment both at national level and for export support, and for carrying out analyses and all types of tests and experimental work, to verify, approve and certify materials, components, equipment and systems. It is also responsible for representing the Government and the administrations in the international organisations entrusted to it (Official State Gazette of 17/10/2015).

INTA carries out tasks of *knowledge generation, brokerage, evaluation and* certification, as well as *government representation (science diplomacy*). However, based on the available documentation, it is challenging to assess the extent to which it performs the role of *knowledge synthesiser*.

The Centre for Energy, Environmental and Technological Research (CIEMAT) employs 1 300 people. It aims to promote and develop basic research, applied research, technological innovation and development activities, with a particular focus on the energy and environmental field, contributing to the development of more efficient industrial processes that preserve human health and the environment. Its research and services are carried out in close cooperation with other research centres and the business sector, which is the ultimate recipient of the innovation resulting from the organisation's R&D. CIEMAT conducts advisory work for public administrations on energy and environmental matters and cooperates with other public research centres. It also participates in numerous national and international committees, including the Energy Commission of the National Defence Studies Centre (CESEDEN), the Executive Committee of the Alliance for Energy Research and Innovation (ALINNE) and the Executive Committee of the European Climate Change Research Alliance.

CIEMAT plays the role of knowledge *generator*, *broker* and government *representation* in a variety of fora.

The Carlos III Health Institute (ISCIII) employs some 900 people. Its tasks are the promotion, development and provision of scientific and technical support to the National Health System, the development of basic and applied research in the field of health, evaluation, scientific and technical accreditation, health control, scientific and technical advice and health training in biomedicine and health sciences. The ISCIII is both a research funding and implementation body, a coordinating body for health science research activities, health information and training, health monitoring and accreditation and scientific and technical advice. According to the statutes of the ISCIII (Official State Gazette of 27 May 2001), its scientific and technical advisory function is enacted by drafting reports on health technologies and health services aimed at informing decision-making at the various levels of the National Health System and by providing scientific and technical advice for the design, implementation, development, maintenance and evaluation of health services.

The ISCIII played a key role during the SARS-COV-19 crisis. Its scientific staff participated in government advisory committees and technical committees set up to contribute to crisis management. Its National Centre of Epidemiology published updated information on the pandemic and set up an analysis group with scientific journalists to provide society with reliable and evidence-based information (Melchor 2023).

ISCIII plays several roles as a knowledge *generator*, *synthesiser* and *broker*, as well as an *evaluator* of some interventions and centres. As it also implements and coordinates part of government's policy in the health field and *represents* the government on various international committees and bodies, the boundary between the strictly political and scientific endeavours is therefore somewhat blurred.

The Canary Islands Institute of Astrophysics (IAC) employs 500 people. It is a public consortium comprising the GAS, the Autonomous Community of the Canary Islands, the University of La Laguna and the CSIC. It is also an OPI of the Administration of the State, without prejudice to its consortium nature. The IAC seeks the scientific exploitation of the skies of the Canary Islands summits, which are of exceptional quality for astronomic observation. Its mission is to conduct astrophysics research and aims to be a world reference centre in the field.

The IAC plays an important role in the field of *science diplomacy*, as it is a key platform for the establishment of agreements and international relations. The IAC Consortium took over its functions, rights and obligations under the Cooperation Agreement signed in 1979 on astrophysics matters with Denmark, the United Kingdom and Sweden and all successive extensions and addenda (Official State Gazette of 21/12/2018). In 2021 alone, the IAC signed specific agreements or arrangements with institutions in France, Italy, Japan, Denmark, Sweden, the United Kingdom, the Slovak Republic and China and with consortia such as the International Network for Optical Observations (Memoria IAC 2021). [21]

3.2.5 Universities

The Spanish Higher Education System has 50 public universities and 26 private universities (Source: CRUE). In 2021, the former employed 116 906 researchers and the latter some 16 329 (INE 2023). One of the University's missions is to transfer or make available to society the knowledge it possesses and to do so in all areas where this incorporation of knowledge could represent social progress (Hernández Armenteros and Pérez García 2021). The diversity of channels for the transfer or social valorisation of knowledge is extensive, but the available data are limited. The CRUE report 'La universidad española en cifras 1920' [The Spanish university in 1920 figures] includes data on the income received by universities to carry out applied research on behalf of companies and institutions (Hernández Armenteros and Pérez García 2021), but does not break down this data by type of contracting body, which makes it impossible to assess the volume of assignments from public administrations.

Most universities (70/76) and OPIs have a Research and Technology Transfer Office (OTRI). Since their establishment in 1988, these structures have been designed to promote collaboration between the University and its research groups with companies, manage patents and other forms of intellectual property protection, and support the creation of spin-off companies (Fernández de Lucio et al., 2008). Although these offices are in principle established as interlocutors with various types of socio-economic stakeholders, they have mainly focused on the relationship with the industrial sector. On the one hand, the Public Sector Contracts Law (9/2017) sets very low limiting amounts for direct procurement, which limits the OTRIs' role as intermediaries in procurement with the administration. In addition, universities have been setting up other types of interface structures (such as scientific culture units) as new channels for knowledge valorisation have been incorporated, and different, specialised professional profiles have been required. The experience gained with the establishment of interface units of various kinds could lay the groundwork for the creation of specific units to support collaboration with public administrations and scientific advice, such as in the UK or Germany. [22]

As we see in the new legislative developments (section 3.1.3), both the LSTI and the OLUS establish a regulatory framework that enables university research staff to collaborate with public administrations through various channels, be it through 'collaborator' positions, institutional mobility via unpaid leave or temporary stays, the signing of contracts or agreements, participation in bodies with consultative and advisory functions or through informal mechanisms of various kinds. Administrations can identify the expert staff carrying the knowledge they need and establish different types of collaborations. However, some interviewees report that there are not enough mechanisms and boundary organisations to support the identification of, and engagement with, academic expertise. The establishment of specific interface units in universities would facilitate this connection.

According to the Gluckman's framework (Table 1), universities play the role of *knowledge producers*, but they also act as essential elements available within the science-for-policy ecosystem, enabling their personnel to perform the other roles and functions, based on their competencies.

[21] See https://iac.es/es/divulgacion/ediciones/memoria-grafica-del-iac-2021.

[22] The *Universities Policy Engagement Network* (UPEN) of the United Kingdom brings together all British universities committed to increasing the impact of research results on public policy, including professional university units in the field of exchange of knowledge between scientific staff and public and political management: https://www.upen.ac.uk/. Other European universities have similar units such as the alliance of Rhein-Main Universities in Germany (see article by their programme manager https://europa.eu/!BJgNVb) or the *Baltic Sea Centre* at Oslo University (see https://www.su.se/stockholm-university-baltic-sea-centre/) or read article from their activities at https://europa.eu/!Q8XTMf).

3.2.6 Scientific learned societies and national academies

Scientific learned and professional societies can act as a link between science, politics and society. For example, the Confederation of Scientific Societies in Spain (COSCE) brings together 86 scientific societies and constitutes an interface between the scientific community and the administration. The objectives of COSCE, according to its statutes, are to contribute to the scientific and technological development of our country; to act as a qualified and unified interlocutor with civil society and its representative public authorities, in matters affecting science; and to promote the role of science and its dissemination as a necessary and indispensable ingredient of culture. [23] As set out in its statutes, COSCE's relationship with public authorities focuses on scientific policy issues. The reports published by COSCE cover analyses of the resources allocated to R&D&I in Spain and ministerial documents and proposals for science policy, such as the Spanish Strategy for Science, Technology and Innovation 2021-2027. [24] COSCE is also very active in reporting on the use of animals in scientific experimentation.

For their part, the national academies are scientific, artistic and cultural corporations created by public authorities and governed by public law, but enjoying autonomy in their internal functioning (Guich Mascort, 2019; Pau Pedrón, 2009). The first were created in the 18th century (Royal Spanish Academy, Royal Academy of History, Royal Academy of Fine Arts and Royal Academy of Jurisprudence and Legislation), and three more would be created in the 19th century (Royal Academy of Exacta, Physics and Natural Sciences, Royal Academy of Moral and Political Sciences and the Royal Academy of Medicine). The list would be completed during the 20th century by the Royal National Academy of Pharmacy, the Royal Academy of Economics and Financial Sciences and, as early as the 21st century, the Royal Academy of Engineering, the Royal Academy of Gastronomy, the Spanish Academy of Psychology and the Youth Academy of Spain. All of them, except for the Academies of Gastronomy, Psychology, Veterinary Science, the Academy of Doctors, and the Young Academy, are part of the Institute of Spain, a public body dedicated to coordinating the different Royal Academies.

Functionally, in addition to carrying out scientific, artistic or cultural activities aimed at disseminating knowledge to society, the vast majority (with the exception of the Royal Spanish Academy and the Royal Academy of Fine Arts) have among their statutory functions the task of providing advice to public administrations. In fact, they form part of the list of bodies with consultative and advisory functions (BCAFs) in the following section. In practice, however, any such direct advice is rare. Another aspect is the potential and difficult measurable impact on policy that knowledge dissemination activities themselves might have, especially when dealing with current public issues. In fact these entities behave more like think tanks (see 3.4). From the perspective of science advice, the advisory role of some academies – specifically, the Royal Academies of Sciences, Medicine, and Pharmacy, particularly the Young Academy – during the COVID19 pandemic, stood out (Melchor, 2023). After analysing the activities of all these academies during 2021 and 2022, it appears that the Royal Academy of Engineering, the Royal Academy of Gastronomy and the Royal Academy of Moral and Political Sciences advised public entities or ministries. [25]

Scientific learned societies and national academies can thus play a variety of functions and roles highlighted in the conceptual frame of reference, sometimes acting as knowledge *brokers* and serving as interlocutors limited by their disciplinary and interest spheres. However, it should be stressed that

[23] See https://cosce.org/.

[24] See https://decides.cosce.org/informe-de-urgencia-sobre-la-estrategia-espanola-en-ciencia-tecnologia-e-innovacion-2021-2027/

[25] The Royal Academy of Engineering collaborated with the state-owned commercial company Radio Televisión Española (RTVE) to promote the programme 'Impulsa Visión RTVE-Empresas (Sandbox): Monitorización automatizada de señales de emisión de RTVE. Aplicación de técnicas de inteligencia artificial' [RTVE Vision Drive-Companies (Sandbox): Automated monitoring of RTVE broadcast signals. Application of Artificial Intelligence Techniques] (Royal Academy of Engineering, 2022: 96). In 2021, several members of the Royal Academy of Moral and Political Sciences were appointed as members of the Open Government Forum (Resolution of the Secretariat General for Civil Service of 9 February 2021, https://transparencia.gob.es/transparencia/dam/jcr:fede9b86-9c54-4444-b2a5-f0c6635fbf51/NombramientoForoAcademicos2021.pdf, accessed 02/09/2023). In 2021, the Royal Academy of Gastronomy produced the Gastronomic Diplomacy Guide, as part of a project developed by the Secretary of State for Global Spain of the Ministry of Foreign Affairs, European Union and Cooperation (https://realacademiadegastronomia.com/guia-de-la-diplomacia-gastronomica/, consulted on 28/08/2023).

their primary role is to defend the interests of their own professional community and to promote scientific culture.

3.3 Bodies with consultative and advisory functions (BCAFs)

Public administration bodies with consultative and advisory functions (BCAFs) are an essential part of policy advisory systems (Craft & Howlett, 2013; Hallligan, 1995; OECD, 2017). They are set up by public administrations, on a permanent or ad hoc basis, to provide advice on policy formulation, design and implementation processes. Their advice may be technical, based on consulting staff with expertise in the field, or of a political nature, with members of these bodies acting as representatives of stakeholders or groups with interest. Sometimes the technical advice and representation functions can take place simultaneously.

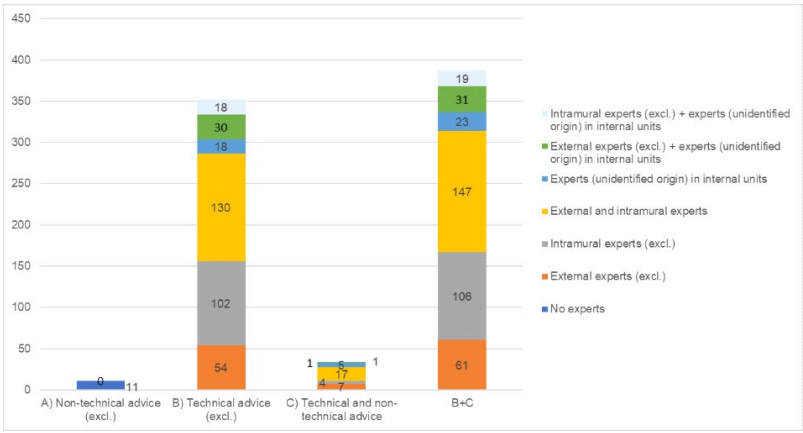
The CONESPOL-PUB project [26] presents this variety in the composition and functions of the GAS's BCAFs. These bodies take different organisational forms:

- Collegiate advisory bodies (e.g. Advisory Commission for Energy Certification of Buildings, in the Ministry of Green Transition; Advisory Council for Telecommunications and the Information Society, in the Ministry of Economic Affairs, or Advisory Council for Science, Technology and Innovation, in the Ministry of Science and Innovation);
- Autonomous bodies (such as the National Geographic Information Centre, attached to the Ministry of Transport, or the Autonomous Agency for National Parks of the Ministry of Ecological Transition);
- Agencies (Spanish Agency for Consumer Affairs, Food Safety and Nutrition, under the Ministry of Consumer Affairs or the Spanish Medicines Agency, linked to the Ministry of Health);
- And other types of administrative entities with their own legal personality (such as the Royal Academies or the National Commission for Markets and Competition). [27]

In total, 398 bodies were identified. The majority (88.4%, 352/398) provides exclusively technical advice. The percentage rises to 97.2% (387/398) if we add BCAFs which, in addition to technical advice, also provide other types of non-technical outputs (e.g. interest representation).

Figure 2 shows the composition of these bodies depending on the origin of the experts. It should be noted that around 16% (61/398) consists of external expert staff only, [28] whereas BCAFs exclusively formed by intramural expert staff account for 27.4% (106/398). Finally, 38% (147/398) have both internal and external expert staff.

Figure 2. BCAFs in the General Administration of the State: functions and composition



Source: CONESPOL-PUB Project. Notes: Data correspond to the end of 2020. The figures indicate the number of BCAFs with that composition. The data collects information on the location of the bodies, that is, whether they are part of the BCAF decision-making structure or are part of specific internal units (working groups, internal technical commissions) that advice the main BCAF

[26] For more information, see section 2.2. Methodology.

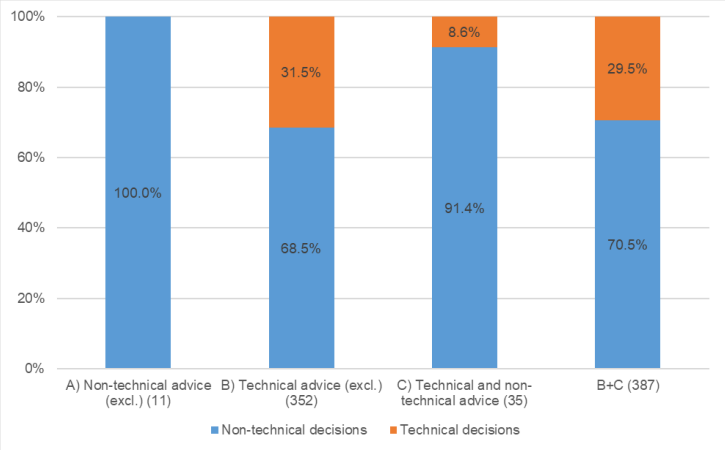
[27] Thus, the data presented on BCAFs include some of the stakeholders addressed in previous sections.

[28] Those working in publicly owned universities, research centres or health centres are considered 'external' expert staff.

bodies. The label 'experts without identified origin' indicates those internal units where it has not been possible to identify the origin of the personnel that compose them. The term 'excl' means 'exclusively'.

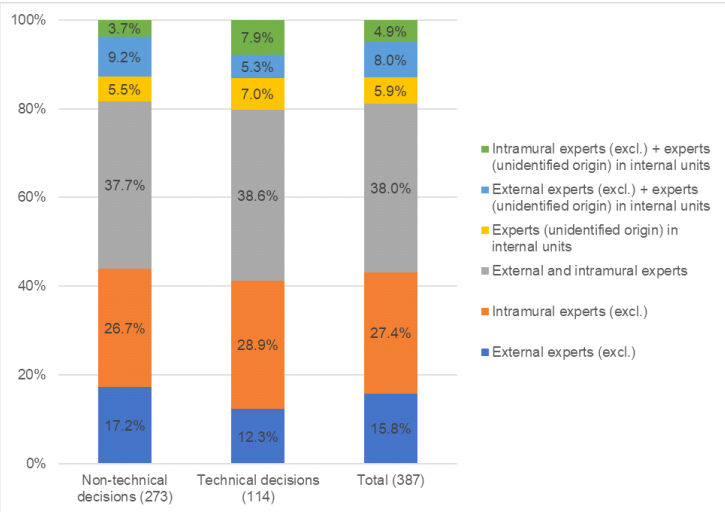
BCAFs vary in their composition and their functions. They sometimes have technical decision functions: 31.5% of the bodies provide technical advice exclusively while 8.6% of the bodies provide both technical and non-technical advice (Figure 3). Being entrusted with technical decision-making functions does not appear to affect the internal composition of the BCAFs (Figure 4). [29]

Figure 3. BCAFs with technical decision functions



Source: CONESPOL-PUB Project. Notes: Data correspond to the end of 2020. In parentheses, the total number of BCAFs corresponding to this category and on which the percentage is established. Technical decision functions refer to decisions that directly involve the application of specialised knowledge (e.g. technical regulations, technical scales, etc.). It also includes those bodies that make specific administrative resolution proposals that must subsequently be ratified by higher-level bodies. These proposals do not include proposals for general regulations, statutes or programmes.

Figure 4. Composition of BCAFs: technical vs. non-technical decisions



Source: CONESPOL-PUB Project. Notes: See note in Figure 2. The figures in parentheses on the horizontal axis represent the number of observations per category.

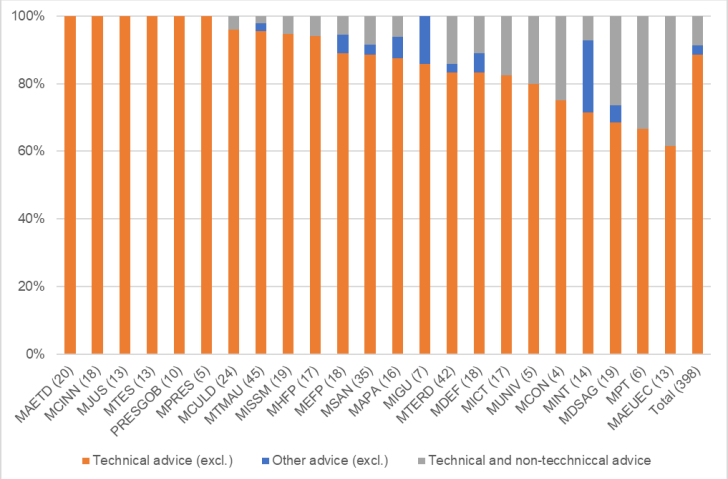
Figure 5 shows the distribution of types of BCAFs by ministries and by type of advice provided. There is great diversity in the number of BCAFs depending on each department. [30] The ministries concentrating a largest number of BCAFs are the Ministries of Transport (MTMAU), Ecological Transition (MTERD) and Health (MSAN). By contrast, the ministries with the least number of BCAFs (from highest to lowest) are

[29] Chi-square=6 171, p=0.29.

[30] In this chart and the following, abbreviations are used for the Spanish government organisations listed in the section 'List of abbreviations'.

the Ministry of Equality (MIGU), the Ministry of Territorial Policy (MPT), the Ministry of Universities (MUNI), the Office of the Prime Minister (MPRES) and the Ministry of Consumer Affairs (MCON). The most prominent type of advice provided by BCAFs in the different ministries is technical advice.

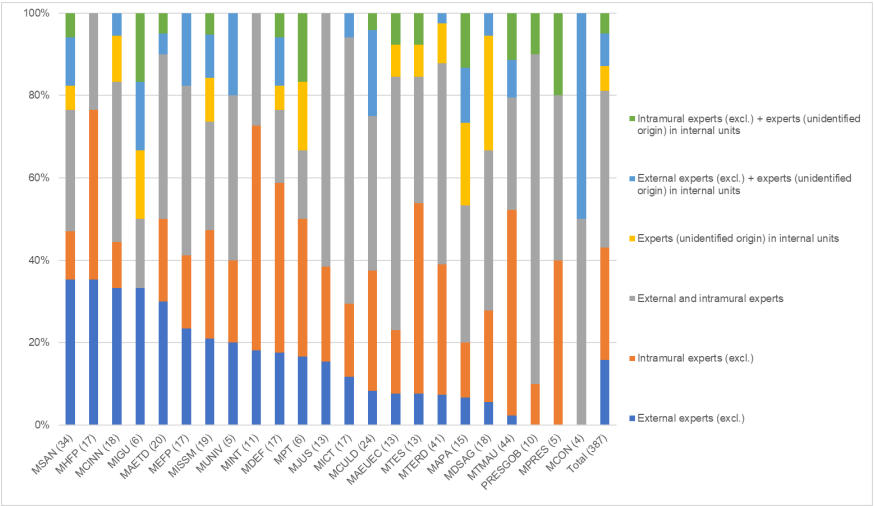
Figure 5. Bodies with consultative and advisory functions: distribution by ministry and type of advice



Source: CONESPOL-PUB Project. Note: Data correspond to the end of 2020, with the exception of the Ministries of Finance and Public Service (MHFP) and Territorial Policy (MPT), where the cabinet reshuffle of July 2021 and the subsequent re-adscription of the BCAFs belonging to the pre-existing Ministry of Territorial Policy and Civil Service has been taken into account. The numbers in parentheses on the horizontal axis represent the number of BCAFs per ministry. For acronyms, refer to the list of abbreviations.

In addition, there is considerable diversity between the different ministries in terms of the type of expert staff that make up BCAFs with technical advisory functions (Figure 6). Thus, organisations consisting exclusively of external experts exceed 30% of those existing in the Ministries of Health (MSAN), Finance (MHFP), Science and Innovation (MCINN) and Economic Affairs (MAETD), with statistically significant differences in the first three cases. The presence of BCAFs consisting exclusively of intramural expert staff is significantly higher in the Ministries of Transport and Interior (more than 50%). On the other hand, mixed BCAFs predominate in the Ministries of Industry (MICT) (64.7%), Justice (MJUS) and Foreign Affairs (MAEUEC) (both 61.5%) and in the organisations directly attached to the Prime Minister's Office (PRESGOB) (80%).

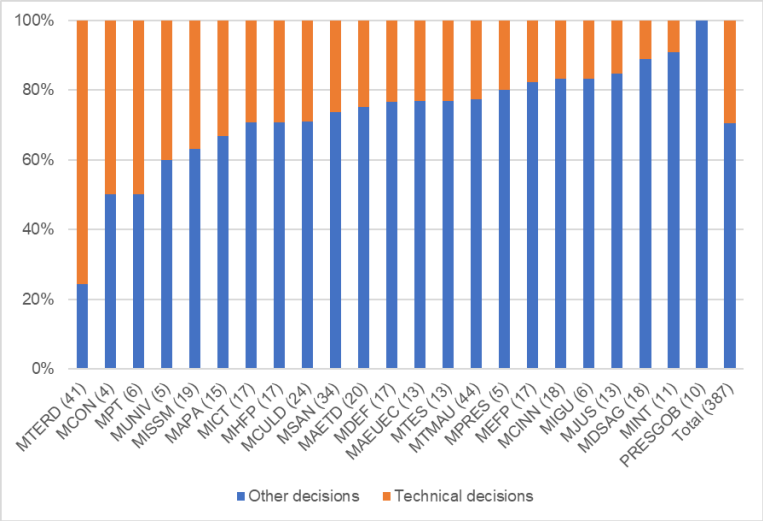
Figure 6. BCAFs with technical advice functions: distribution by ministry and by type of composition



Source: CONESPOL-PUB Project. Note: Data correspond to the end of 2020, with the exception of the Ministries of Finance and Public Service (MHFP) and Territorial Policy (MPT), where the cabinet reshuffle of July 2021 and the subsequent re-adscription of the BCAFs belonging to the pre-existing Ministry of Territorial Policy and Civil Service has been taken into account. The numbers in parentheses on the horizontal axis represent the number of BCAFs per ministry. For acronyms, refer to the list of abbreviations.

Finally, Figure 7 shows the distribution of BCAFs with technical decision functions per ministry. Here, the largest proportion is concentrated in the Ministry of Ecological Transition and Demographic Challenge (MTERD), where 75% of BCAFs also have technical decision-making capacity. It is followed, in relative terms, by the Ministries of Consumer Affairs and Territorial Policy (50%). By way of contrast, this proportion barely reaches 10% in the Ministry of the Interior or in the Ministry of Social Rights. Finally, none of the BCAFs under the Presidency of the Government takes decisions of a technical nature.

Figure 7. BCAFs: Proportion of bodies with technical decision-making authority by Ministry



Source: CONESPOL-PUB Project. Note: The numbers in parentheses on the horizontal axis represent the number of observations in each department. For acronyms, refer to the list of abbreviations.

In short, this analysis shows the large number and diversity of BCAFs that feed the decision-making processes in the GAS. With regard to the interaction with the scientific system, a substantial part of BCAFs (64%) has external expert staff in their composition, and it can be assumed that a significant proportion of these external expert staff belong to research centres and universities. The diversity of BCAFs is seen both in terms of their internal composition and the presence of external or intramural expert staff, and in terms of the type of advice they provide and their direct or indirect participation in political decision-making. There is also a noticeable variety in the composition and functions of these bodies across the different ministries.

Returning to Gluckman, the BCAFs would perform relevant functions within the science-for-policy ecosystem, mainly supporting the systemic and technical understanding of issues and aiding in identifying potential options for political action, primarily acting as knowledge *synthesisers* and *brokers*. This does not prevent them from collaborating in dealing with emergencies or foresight exercises.

3.4 Independent think tanks

Other stakeholders in the ecosystem are think tanks, organisations aimed at producing and disseminating ideas directly related to public policy, with the intention of influencing its design through persuasion and evidence-based argumentation (Pautz, 2011). Their characteristics are varied, and it is therefore difficult to give a single definition (Abelson, 2018; Stone, 1996). In any case, they are boundary organisations (Guston, 2000) located between scientific research, policy and social action (Paulz, 2020).

Their boundary character is evidenced by their mixed features:

1. The emphasis on the *production* of applied scientific knowledge, as well as the roles of *broker* and *synthesisers* of that knowledge with a view to its transmission to the political and policy process and influencing the public debate.

2. Independence from government intervention or other interested stakeholders, as they are usually private and not-for-profit organisations. This autonomy may be weakened by dependence on external financing. In these cases, the presence of multiple employers and the need to maintain reputation act as moderators of the ability to interfere externally in their operations or agendas. The fact that the internal activities of think tanks (particularly those

related to knowledge *production*) are subject to professional rules and standards specific to scientific organisations, also contribute to that independence (Ziman, 2000).

3. Think tanks can act as genuine 'public policy entrepreneurs' (Kingdon, 1995), promoting certain public ideas and policies to public opinion or policymakers. Their role would fit with Pielke's 'scientist activist' or '*science advocate*' (2007) (section 2.1). However, the weight in the use of scientific evidence is greater among think tanks than among other organisations that also play this type of role in representing and defending public or private collective interests (Real-Dato, 2005) (see Box 2).

4. The focus on influencing public debate means that think tanks usually attach particular importance to the public dissemination of the knowledge they produce or synthesise. These organisations strive for communication and dissemination, both to the general public and to specific audiences. It is common for think tanks to measure their impact by the impact of their activity on public opinion (media) (McDonald, 2014) and on the creation and maintenance of networks with other stakeholders (including, of course, public decisionmakers).

As already pointed out by Stone (1996: Chapter 1), the reality of think tanks is highly diverse, both organisational and geographical, and may therefore sometimes not fully correspond to the above features. For example, the emphasis on the independence of think tanks should not obscure the fact that these organisations often embrace a particular ideology that determines their activity. The most extreme case is found in think tanks that are directly linked to and dependent on political parties or interest groups. Financing through contracts, mainly with public bodies, can be an obstacle to the theoretical independence of these organisations (Pautz, 2020). The distinction between think tanks and research centres has also become more blurred by the creation, under the umbrella of universities, of specific institutes aimed at contributing ideas to the debate on public policy.

In the following sub-sections, we first provide an overview of the main Spanish think tanks using as a reference the list of 62 active think tanks between 2009 and 2018 drafted by Castelló-Sirvent and Roger-Monzó (2021). Of these, we take the top 10 in terms of visibility in national media. In the second sub-section, we cover a specific think tank—COTEC—which, although not included in the previous selection, is very active in creating links between the scientific system and public policy.

Box 2. Lobbying organisations and professional corporations

The main function of these organisations would be to represent and defend collective public or private interests *vis à vis* public authorities and society. These include trade unions, business organisations, professional corporations and other organisations focused on the promotion of interests, such as environmental issues, defence of territorial interests or of certain groups of population (women, the elderly, homosexuals and transsexuals, patient organisations, etc.). This category would also include some stakeholders in the R&D system aimed at defending the interests of the sector, such as scientific societies, previously discussed.

These organisations may also be involved in the scientific advisory ecosystem as *producers* or transmitters of expert knowledge. For example, in the socio-labour area, the two main Spanish trade unions, the 'Unión General de Trabajadores' (UGT) and the 'Comisiones Obreras' (CCOO) have study departments and have created observatories on various topics. [(31)] The Spanish Confederation of Business Organisations (CEOE) has one of the main Spanish think tanks analysed below, the Institute for Economic Studies (IEE). Similarly, the main Spanish environmental associations (Greenpeace, Ecologists in Action, WWF) generate a wealth of reports and studies to support their activist positions. Also, for example, within the stakeholders of the scientific-technical system, the Spanish Federation of Technological Centres (FEDIT), which is mainly dedicated to representing the interests of these organisations, has produced some reports analysing the situation of the sector in Spain.

[(31)] See UGT's research service: https://servicioestudiosugt.com/quienes-somos/; for CCOO, see https://www.ccoo.es/Estudios. Both websites accessed on 02/09/2023.

The work of professional bodies and corporations is geared towards self-governing of the profession and representation and the defence of their interests and those of their members and, thus, their possible role in policymaking would have to relate above all to *advocacy*. However, like other interest representation organisations, they can also act as *synthesisers* and *brokers* of the expert knowledge produced in their respective professional communities. Thus, analysing a non-representative sample of nine professional bodies at national level which group together the associations of the various professional branches, [32] a slight majority (5/9) performs activities to generate specialised knowledge, such as drafting reports and produce studies or data. The same proportion of these organisations develop actions aimed at influencing the policy process too: meetings with public decision-makers, participation in advisory bodies or submission of reports on draft regulations.

3.4.1 The main think tanks in Spain and their role in the science-for-policy ecosystem

This analysis of the role of think tanks within the science-for-policy ecosystem focuses on the top 10 of the Castelló-Sirvent and Roger-Monzó list (2021). These 10 organisations account for just over 70% of the news mentioning one of the 62 think tanks published in the reporting period (Figure 8): FUNCAS (18.2%), *Círculo de Empresarios de Madrid* (CdEmp) (11.5%), *Fundación de Estudios de Economía Aplicada* (FEDEA) (10.5%), *Real Instituto Elcan*o (6.7%), *Instituto de Estudios Econó*micos (EEI) (6.5%), *Cercle d'Economia* (CdEco) (6.0%), Action against Hunger-Spain (4.7%), *Fundación Alternativas* (2.6%), Barcelona Institute for Global Health (ISGlobal) (2.4%) and *Fundación de Análisis y Estudios Sociales* (2.3%). [33]

Of these organisations, eight are based in Madrid. Their size (measured in annual expenditure budget) is varied, ranging from over EUR 33 million in ISGlobal to just over EUR 750 000 in FAES (Figure 8). [34] In terms of organisational form, the majority (70%) adopt the legal form of a foundation, and the rest (CdEco, CdEmp, IEE), that of an association. In three of these foundations (FEDEA, *Real Instituto Elcano* and ISGlobal), the trustees include government entities. Also under the governance section, half (FUNCAS, CdEmp, Elcano, *Alternativas* and ISGlobal) has an external body with consultative or advisory functions. In three cases, there is an advisory body that advises in the field of its scientific activity (FEDEA, Elcano and ISGlobal). In their areas, almost all of them have a multi-sectoral nature, addressing economic, social policy, education and sustainability issues. Only ISGlobal and Action Against Hunger focus on global public health and humanitarian action respectively.

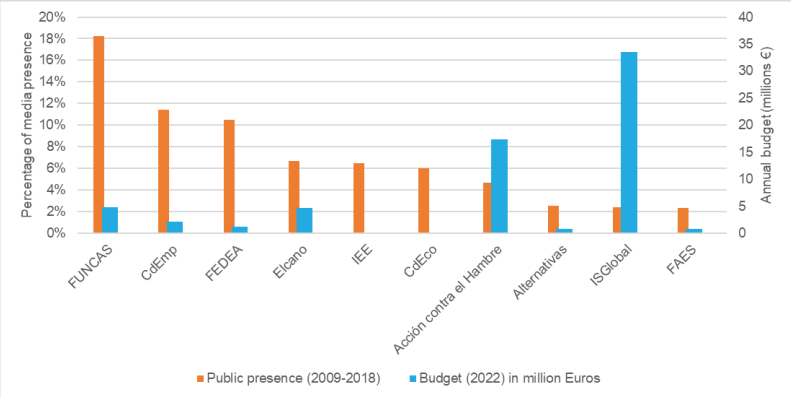
Four of these think tanks have a concrete ideological positioning, either with the promotion of 'freedom of enterprise' (CdEmp, EEI) or with specific policy fields of thought: progressive in the case of the *Fundación Alternativas* and 'centre-liberal reformist' in the case of FAES. Indeed, these organisations are closely linked to the two main political parties in Spain, the Socialist Party (PSOE) and the Popular Party (PP) respectively. In five other think tanks, the chairperson or management has held senior positions in the public administrations. The only three organisations with no explicit political link are the CdEmp, FEDEA and the *Real Instituto Elcano*.

[32] The following organisations were selected for this analysis, using as criteria both the qualitative importance and the size of the professional group within the respective field (in brackets): General Council of the Bar (legal), General Council of Official Medical Schools (health), Higher Council of the Colleges of Architects of Spain (architecture), General Council of Industrial Engineers (engineering), General Council of Economists of Spain (economy and trade), General Council of the Official Schools of Real Estate Agents of Spain (management and services), General Council of Official Biologists' Associations (experimental sciences), General Council of Official Schools of Pedagogues (education) and General Council of Social Work (social sciences).

[33] The list of Castelló and Roger (2021) ranked 8th in the IDEAS Foundation, but has been replaced in this analysis, as it ceased operations in 2014, by FAES, who ranked 11th.

[34] Data from the 2022 annual budget. Data (economic as well as that covered in these pages) have been obtained from the corporative websites, accessed on 4th August 2022: https://www.funcas.es; https://circulodeempresarios.org; https://fedea.net/; https://www.realinstitutoelcano.org/; https://www.ieemadrid.es/; https://cercledeconomia.com/es/; https://www.accioncontraelhambre.org/es; https://fundacionalternativas.org/la-fundacion/; https://www.isglobal.org; https://fundacionfaes.org/. There were no economic information for IEE nor for CdEco. Regarding Action against Hunger-Spain, the only considered Budget was that in relation to public incidence activities (this is, public action).

Figure 8. Ten leading think tanks in Spain: public presence and budget



Source: Adapted from Castelló-Sirvent and Roger-Monzó (2021) (public presence) and author's own elaboration (budget). Note: The left axis shows the percentage of news mentioning any think tank between 2009-2018. All organisations were active during the analysed period, except ISGlobal, which started its activity in 2010. The right axis shows the expenditure budget of each organisation for 2022 (in million euros). Data are not available for IEE and CdE.

Data reveal the contribution of think tanks to the transfer of expert knowledge to the political and policy process: half have research staff within their structure. The number varies widely: from 356 at ISGlobal to four at the *Fundación Alternativas*. All have researchers linked to universities or other research centres in their structure. In addition, these five centres have expert staff outside the academic field.

Table 3. Ten leading Spanish think tanks: numbers and types of publications

	Total publications in 2022	Working papers and others	Data and situation reports	Policy reports	Books	Own journals
ISGlobal	594 (*)	Yes	Yes	Yes	No	No
Elcano	312	Yes	Yes	Yes	Yes	No
FAES	87	Yes	Yes	Yes	Yes	Yes
FEDEA	72	Yes	Yes	Yes	No	No
FUNCAS	63	Yes	Yes	Yes	Yes	Yes
CdEmp	55	Yes	Yes	Yes	No	No
Acción contra el Hambre	49	Yes	No	Yes	Yes	Yes
Alternativas	39	Yes	Yes	No	Yes	No
IEE	12	Yes	Yes	Yes	Yes	Yes
CdEco	3	Yes	No	No	No	No

Source: Own elaboration based on data available on the organisations' websites. Note: Information about the types of publications refers to the last three years (2021-2023). (*) ISGlobal data includes publications in external academic journals.

The five *think tanks* without research staff in their structure (CdeEmp, CdEco, IEE, Action against Hunger and FAES) commission the production of data and expert knowledge outside the organisation, mostly academic research staff. However, several of the bodies with researchers in the workforce also make use of the research committee outside, such as the *Fundación Alternativas* (with only laboratory or research unit managers in its structure), FUNCAS or ISGlobal.

The dissemination of ideas is central to think tanks. Each organisation has its own policy on which, using different formats, it bases its transfer of knowledge to interested audiences and public decision-makers (Table 3). FUNCAS and FAES cover a wide range of publication formats. Most agencies (80%) publish policy reports on specific measures or policies, showing their search for public impact. A majority (80%)

also publishes data or situational reports and all institutions publish a series of working papers. [35] Others also opt for traditional formats such as books (60%) or even publish their own magazines (40%).

In relation to the total number of publications, ISGlobal and the *Real Instituto Elcano* stand out (although the data on ISGlobal's website do not distinguish between internal and external publications in academic journals). In contrast, the aforementioned CdEco and the IEE have very low publication intensity.

Moreover, think tanks carry out a range of additional activities for the external dissemination of their work and research. Table 4 shows the diversity and homogeneity of such action in these 10 organisations. All carry out dissemination activities to appear on mainstream media, as well as on social media. They also organise activities and events to disseminate their research or ideas and to foster networking with public decision-makers and other stakeholders.

Table 4. Ten leading Spanish think tanks: outreach and dissemination activities

	Events	Newspapers	TV-radio	Social network	Newsletters	Blog
FUNCAS	Yes	Yes	Yes	Yes	Yes	Yes
CdEmp	Yes	Yes	Yes	Yes	Yes	No
FEDEA	Yes	Yes	Yes	Yes	No	Yes
Elcano	Yes	Yes	Yes	Yes	Yes	Yes
IEE	Yes	Yes	Yes	Yes	No	No
CdEco	Yes	Yes	Yes	Yes	No	No
Acción contra el Hambre	Yes	Yes	Yes	Yes	No	Yes
Alternativas	Yes	Yes	Yes	Yes	Yes	No
ISGlobal	Yes	Yes	Yes	Yes	Yes	Yes
FAES	Yes	Yes	Yes	Yes	Yes	No

Source: Own elaboration based on data available on the organizations' websites. Note: Activity recorded in the last three years (2021-2023).

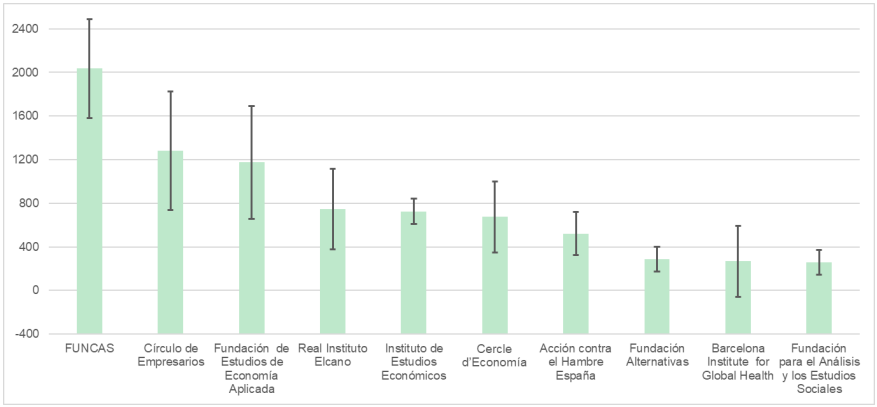
The main Spanish think tanks seek to maximise their external impact, regardless of the intensity of their research activity and the production of ideas. The extent to which they achieve this objective is another question. Figures 8 and 9 confirm the disproportion of media impact between different *think tanks*.

These media appearances can be understood as a measure of the presence of these entities in the public debate. It is more difficult to extrapolate and assess the actual impact they have on the debate itself, as well as on the public policymaking process. In fact, the information obtained from the in-depth interviews conducted for this report with representatives of Spanish *think tanks* (including some of those mentioned herein), as well as with researchers employed by the think tanks, demonstrates the difficulty of establishing a direct connection between the employees of these organisations and public policy designers and decision-makers. As stakeholders in the public policy process, the role of Spanish think tanks would lie primarily in the formation phase of the political and/or policy agenda.

The roles that these organisations take on are diverse and can cover all those proposed by Gluckman, albeit with varying intensity, acting as *knowledge producers* and synthesisers, as well as *brokers* and sometimes as *evaluators* (see section 3.6). They often also play the role of '*activist*' or '*science advocate*' by Pielke (2007).

[35] Publications that cannot be located in the other categories of Table 4 have been included in this category.

Figure 9. Ten leading Spanish think tanks: annual average media mentions between 2009 and 2018



Source: Adapted from Castelló-Sirvent and Roger-Monzó (2011). Note: Mentions in Spanish media, regardless of the language in which they are published. Error bars represent the standard deviation during the considered period. All organisations were active throughout the entire analysed period, exccept for ISGlobal, which started its activity in 2010. ISGlobal's average has been calculated considering its active period.

3.4.2 The COTEC Foundation

The COTEC Foundation for Innovation is a private non-profit organisation whose mission is to promote innovation as a driver of economic and social development, with innovation understood from a broad perspective as 'any knowledge-based change that generates value (not only economic)'. [36] COTEC seeks to contribute to making Spanish society more sensitive to the value of scientific and technological research and to making Spanish companies and society more prone to the adoption of innovations. It has an internal team of 15 people and an external network of 100 experts across multiple disciplines to collaborate on innovation processes in different areas. On their Board of Trustees, there are many companies, but also public administrations at local and regional level, as well as some public universities.

It acts as an observatory for R&D&I in Spain, providing analysis and advice on innovation, technology and the economy. COTEC collects, generates and analyses data for the drafting of COTEC Reports, concerning the SECTI stakeholders. It also develops and finances a number of projects and programmes aligned with the fulfilment of its core objectives. In its overall performance, COTEC promotes a forum for interaction between the different stakeholders of the SECTI.

COTEC is based on the notion that public administrations are key players in the Innovation System, not only as RDI funders or R&D implementers (such as OPIs), but as a key domain/context for introducing innovations that improve public management processes and policy design and implementation. Its Strategic Plan 2022-2024 makes experimentation, especially in the area of public policy, a priority axis. It supports the design, implementation and evaluation of evidence-based policy and scientific advice as a priority. This is due to the conviction that, as the administration is not designed to innovate, it does not adequately incorporate knowledge when trying to do so, unlike the company, which is subject to competition and other regulations. Thus, its aim is to encourage public policy to build on the knowledge generated internally and that available outside the administration, particularly with scientific evidence and that generated through exploration and experimentation.

In its approach to innovation in the public sector, COTEC has developed a model that places science advice at the basis of the tools or elements needed in the process of designing, implementing and evaluating public policy. The Foundation played, for example, a key intermediary role in the collaboration of *Ciencia en el Parlamento* with the Congress of Deputies, and the process that led to the launch of Office C in the Congress of Deputies (see section 3.1.2). It also proposed amendments to the draft LSTI, encouraging the debate on the recognition of scientific, technological and innovation advice as an essential scientific activity in democracies, and on the desirability of setting up ministerial units for science and innovation advice, thereby connecting the Spanish government departments with the scientific community and promoting the European principle of innovation in public management (Melchor 2021).

[36] See https://cotec.es/la-fundacion, accessed on 02/09/2023.

COTEC distributes more knowledge than it generates, playing a role as a knowledge *broker* in SECTI, although, to a lesser extent, it also performs functions of knowledge *generation* and *synthesis*.

3.5 The policy evaluation subsystem in Spain

The evaluation of public policy and programmes is another interface between the scientific field and public policy. Evaluation can be understood as the systematic activity of collecting and analysing information, aimed at describing and making value judgements on a reality, according to established standards or benchmarks as a basis for decision-making (Garde Roca, 2004). In public policy, the evaluation would aim to collect and analyse information (either at strategic level, for a policy or policy area as a whole, or at operational level, for specific programmes or projects) on the effectiveness of public interventions, their efficiency, their impact and their coherence (Garde Roca, 2006). The evaluation of policy would appear as a distinct activity from other types of activity aimed at organisational control, such as auditing, budgetary control or performance management control systems, as the focus would be on the results of public policy rather than on its economic consequences or on internal organisational processes. [37]

Spain is lagging behind in the institutionalisation of policy evaluation compared to Western Europe (Bustelo, 2020; Casado and Pino, 2022). It had an initial boost following its accession to the European Economic Community (EEC) in 1986, and in the 1990s, linked to the implementation of programmes financed by European funds (Viñas, 2009). In those years, the evaluation activity was also carried out at sectoral level, especially in health, education, social policies and international cooperation (Arriazu, 2015).

During the 2000s, the Spanish Evaluation Society (SEE) was set up and progress was made in consolidating and institutionalising policy evaluation activities in both the GAS and the regional administration or Autonomous Communities. [38] In the GAS, several sectoral bodies, such as the National Agency for Quality Assessment and Accreditation (ANECA), were established in 2001 for the assessment in higher education of organisational and staff aspects rather than in the evaluation of policies and programmes. And in development cooperation, Law 23/1998 on International Development Cooperation established the obligation to evaluate projects in this field financed with state funds. Since then, it has been one of the sectors with the greatest consolidation of the evaluating activity (Bustelo, 2020: 308-309).

The key step towards institutionalising the assessment in the GAS would be the creation, in 2007, of the Agency for the Evaluation of Public Policy and the Quality of Services (AEVAL), as a commitment to modernising public administrations in order to guide them towards achieving results and improving the quality of services provided to the public (Garde Roca, 2023). However, the economic crisis that struck in 2008 severely affected their work. The budget cuts that followed and the lack of political support from successive governments limited the agency's capacity, especially from 2012 onwards. This dynamic would culminate in the abolition of AEVAL as an autonomous body in 2017. Its resources and staff were incorporated as a sub-directorate-general within the structure of the Ministry of Finance and Civil Service, in the form of a new Institute for Public Policy Evaluation (IEPP), with a more limited activity than its predecessor, focusing above all on promoting and disseminating the evaluation culture within the National Government (AIReF, 2021a). In 2022, it only carried out the evaluation of one public policy: that of the Third Africa Plan (IEPP 2023).

In contrast to the setback that the relegation of the AEVAL represented for the institutionalisation of policy evaluation, the creation of the Independent Authority for Fiscal Responsibility (AIReF) in 2013 is worth highlighting. Imposed as a condition of the European Stability Mechanism (ESM) economic assistance package that Spain agreed to receive in the second half of 2012, AIReF would be entrusted with the task of 'ensuring effective compliance by general government with the principle of budgetary stability laid down in Article 135 of the Spanish Constitution, through the continuous assessment of the budgetary cycle, public indebtedness, and the analysis of economic forecasts' (Article 2, Organic Law 6/2013 of 14 November 2013 establishing the AIReF).

[37] Other bodies with powers of evaluation, aimed at economic or organisational control, such as the Court of Auditors, the General Audit Office of the State Administration or service inspections, are not covered here.

[38] The Autonomous Communities with legislation and structures to institutionalise policy evaluation are: Andalusia, Aragon, Balearic Islands, Castile and Leon, Catalonia, Region of Valencia, Navarre, Basque Country and Region of Murcia (Zúñiga Guevara, 2022).

AIReF is an independent body to control public expenditure, but where work on the assessment of public policies and programmes also constitutes one of the strategic pillars of its activity (AIReF, 2020). Thus, it carries out studies on behalf of public administrations which involve evaluations of policies and programmes, focusing on the efficiency of the use of public resources. Of particular note is the Action Plan for the Joint Spending Review for 2018-2021, commissioned in 2017 by the central government. Under this plan, AIReF assessed 13 policies from different sectoral areas (AIReF, 2017, 2018, 2021b). [(39)] In 2022, the Council of Ministers renewed the engagement to AIReF for a new spending review for 2022-2026 (AIReF, 2022). Together with these evaluations, this body delivers other ad hoc assessments or at the request of the Autonomous Communities. [(40)]

The renewal of the AIReF *Spending Review* is also a sign of the impetus received by the central government's policy assessment in recent years, essentially in relation to the implementation of the RTRP, drawn up under the conditions established by the EU for Member States to benefit from the financial support linked to the *Recovery Plan for Europe: NextGenerationEU*. Component 29 of the RTRP ('Improving the effectiveness of public expenditure') sets as a reform, inter alia, the 'Consolidation of the expenditure evaluation process by approving a new Spending Review process for a period of 5 years (2022-2026), separating the process from the political cycles' (Spanish Government, 2021).

The conditionality imposed by the EU on the Spanish government to benefit from the *Recovery and Resilience Facility* funding is also behind what is probably the main milestone experienced by the policy evaluation at AGE level since the creation of the AEVAL. In December 2022, the Spanish Parliament adopted Law 27/2022 of 20 December on the institutionalisation of the evaluation of public policy in the GAS. This Law was one of the commitments made by the Spanish Government in the section on the Modernisation of the Public Administration, as part of the reforms proposed in the RTRP (European Commission, 2021). Although at the time of writing this act still lacks regulatory development, it is to be hoped that its implementation will 'strengthen and provide stability and quality to policy evaluation' in Spain (Varela Merino, 2023: 40). In any case, prior to the adoption of the act, the status of policy evaluation in the GAS provided room for improvement and its institutionalisation was still precarious, as pointed out by the IEPP itself (2021).

Box 3. The evidence-based policy movement

The momentum of evaluation in public administrations has also been linked to external advocacy by other stakeholders. Alongside the action of the Spanish Society for Evaluation, or the work of individual promoters (Arriazu 2015), it is worth mentioning the role played by various stakeholders committed to the drive in Spain of evidence-based policymaking (41) and the implementation of interventions based on behavioural economics (nudges) (Cabrales Goitia and Rey Biel 2021, Costas Pérez and Tucat 2021, Cuello 2018, Miller, 2021).

A basic principle for this movement is the need to systematically evaluate the causal effectiveness of public interventions prior to their final approval in the form of programmes or policies, using available scientific evidence, and preferably through randomised controlled trials (RCTs) (Miller and Rodríguez Marín 2023).

[(39)] AIReF (Spending Review 2018-2021, https://www.airef.es/es/evaluaciones-spending-review-2017-2020/, accessed 15/08/2023).

[(40)] AIReF (Autonomous Communities, https://www.airef.es/es/evaluaciones-comunidades-autonomas/, accessed 15/08/2023).

[(41)] Recently, the European Commission has advocated using the alternative term '*evidence-informed policymaking*'. This term corrects the technocratic bias (faith in the accumulation of knowledge as the key to finding better solutions) involved in the expression 'evidence-based'. This recognises the biases of scientific activity and its limitations in solving complex problems with important political or moral components on its own. To speak of 'evidence-informed policymaking' would imply accepting these limitations and the need to respect the independence of policymakers, who should incorporate the best available evidence in their decisions, along with the values and interests at stake (European Commission, 2022). Here we retain the term 'evidence-based policymaking', given the emphasis placed by the stakeholders alluded to (some of them interviewed for this report) on the need to reinforce the weight of scientific evidence in decision-making processes.

Some think tanks such as the COTEC Foundation or the most recent EsadeEcPol Centre for Economic Policies are particularly active. The latter has created a Policy Impact Lab focusing on the ex post evaluation of already active policies and the design of controlled experiments for the ex ante verification (in pilot programmes) of the effectiveness of new interventions. [42]

For its part, COTEC is particularly committed to working in the field of RCTs and supporting evidence-based policymaking. According to the conversation with its current director, COTEC is working on a RCT project to convert several rural communities into circular economy demonstrators, analysing the impact of systemic economic and environmental changes and the results of which could serve as a basis for policy design.

To summarise these sections, Table 5 provides an overview of the stakeholders identified in the Spanish scientific and technical advisory ecosystem with an assessment of their functions and roles:

- Spain has a rich and varied scientific and technical advisory ecosystem, with multiple organisations playing different and complementary roles in the science-policy interface.
- In recent years, new organisations have been created to support the work of government and parliament with scientific and technical knowledge, and a series of laws and strategies have been adopted to reinforce the processes for designing public policy informed by scientific evidence.
- The OPIs are involved in knowledge brokerage and in the scientific diplomacy exercise. The CSIC highlights its recent impetus to provide public administrations with the scientific evidence it produces, as well as the recent integration of national centres already fulfilling this function.
- In universities, the creation of science-policy interface units, following the steps of the knowledge transfer and scientific communication units, could support collaboration with public administrations and the exercise of science advice, facilitating links proposed in the new regulations (scientific mobility, public procurement...).
- Scientific learned societies and academies sometimes act as knowledge brokers, acting as interlocutors limited by their disciplinary and interest spheres. However, their primary role is to defend the interests of their own professional community and to promote scientific culture.
- There is a wide variety of bodies with consultative and advisory functions (BCAFs) in the Spanish public administration. Their diversity can be seen both in their internal composition and in the presence or otherwise of external or intramural expert staff, and in the type of advice they provide and their direct or non-participation in decision-making. There is a noteworthy diversity in the composition and functions of these bodies across the different ministerial departments. They mainly support the systemic and technical understanding of the problems and help identify possible options for political action, playing the role of synthesisers and knowledge brokers.
- Spanish think tanks seek to influence the shaping phase of the policy agenda, enabling them to act as knowledge producers and synthesisers, as well as brokers and sometimes even as evaluators. They often also play the role of 'activist' or 'science advocate'.
- After years of instability, key recent steps have been taken towards the institutionalisation of the evaluation of public policy, in part catalysed by commitments to European institutions, and supported by promotion of evidence-based policymaking by stakeholders external to public administrations as well as some internal policy entrepreneurs.

[42] For more about EsadeEcPol, see the information and documentation available at: https://www.esade.edu/ecpol/es/nosotros/ and https://www.esade.edu/ecpol/es/nosotros/#policy-impact-lab (accessed 25/08/2023).

Table 5. General overview of the roles and functions of the actors/organisations in the Spanish science-for-policy ecosystem

Organisations		Roles				Functions				
		Production	Synthesis	Knowledge brokerage	Evaluation	Support for understanding and identification of policy options	Evaluation	Emergencies and crises	Diplomacy	Foresight
National Office for Foresight and Strategy		++	+	+++		+++		+++	++	+++
Office C			+++	+++		+++			++	+
OPIs	**CSIC**	+++	+	+	+	++	+	+++	+++	+
	INTA	+++		++	++		++		++	
	CIEMAT	+++		++		+			++	
	ISCIII	+++	++	++	++	++	++	++	++	
	IAC	+++							+++	
Universities		+++	?	?	?	?	?	?	?	?
Scientific learned societies		+	+	+		+				
National academies		+	+	+		++				
BCAFs			+	+++		+++		++		+
Think tanks		++	+	+++	++	+++	++			++
Subsystem of evaluation		++			+++	+	+++			

Source: own elaboration using the collected qualitative information and the conceptual framework by Gluckman (2018). The crosses in the cells mark the authors' perception of the performance of a function or role by the corresponding actor or sub-system of actors, and the number indicates the perception of the intensity (measured from 1 to 3) in the performance of the role or function, or whether or not it is a priority within the framework of each actor's functions. In the case of universities, we do not have enough information about their role to assess its performance or intensity.

4 The vision from the political and public administration system: use of knowledge by senior officials and managerial staff of the General Administration of the State

This section completes the overview of the science-for-policy ecosystem by showing the perspective of public decision-makers. Specifically, we will focus on the senior and managerial staff of the GAS and how this central group of stakeholders in the political and policymaking process in Spain perceives the role of scientific evidence and uses it in the formulation, design and implementation of public policy.

To this end, we will use data from the CONESPOL-PUB project survey, [43] conducted between November 2021 and July 2022 in online mode (self-administrated questionnaire). The target population was the senior officials and managers of the GAS: state secretaries, secretaries-general, directors-general, technical secretaries-general, deputy directors-general, and other positions in charge of administrative units ranked at or above that of sub-directorate-general, such as directors of cabinets of ministers or state secretaries, or heads of technical cabinets. In total, the survey population comprised the heads of 1 012 bodies across the 22 ministries. As it was not possible to obtain all contact addresses, the final number of people invited to take part in the survey was 952. Of these, there were a total of 324 valid responses, giving an overall response rate of 34% (Table 7).

The questionnaire included questions on respondents' preferences on the use of scientific evidence, frequency in the use of results of scientific studies and the type of use made. It also asked about how much respondents interacted with academics and researchers, their use of academics and researchers as a source of information, and their perceived influence on policy design.

4.1 Preferences on the actual use and use of scientific evidence and evaluation in public policy

The CONESPOL-PUB survey focused on the use of scientific evidence (understood as results of scientific and technical research) as input into public policymaking. It should be noted that this is not the only product resulting from the application of the scientific or expert knowledge used in the field of public policy. Legal reports, evaluations, information resulting from organisational control technologies, statistics or surveys may also be produced in the science and academia subsystem and used in the formulation and implementation of policies and programmes.

However, the use of scientific evidence as a basis for policy decisions and designs constitutes the most complete expression of the incorporation of scientific-expert knowledge by the stakeholders of the political and public administration system. To some extent, the assumption of the results of scientific-technical studies implies an acceptance by decision-makers of the primacy of the criteria of the scientific subsystem over the usual criteria of the political subsystem, such as the interests or ideological preferences of the political stakeholders in the decision adopted. This can also be extended to the results of policy and programme evaluations, provided that the same situation of primacy is present in these evaluations. By contrast, the use of statistics, surveys or internal control data does not imply a duty to postpone their basic ideological interests or preferences.

Evidence from the CONESPOL-PUB survey shows that senior officials and managerial staff in ministries are in favour of increasing the use of scientific evidence as a tool to increase the effectiveness of public policy in their respective areas of competence. The average score (7.4 on a scale of 1 to 10) is above other measures aimed at that purpose, such as involving citizens or stakeholders in the policymaking process (5.3 and 6.6, respectively), or the use of instruments based on behavioural interventions (*nudges*) (6.3), but behind other measures such as reinforcing coordination with other ministerial departments and administrations (8.5), increasing the resources allocated to implementing units (8.3) or improving the qualification of implementing units' staff (8.2). As regards the distribution of preferences among different ministries, although there are differences between them (such as between Health, Social Rights, Universities or Science and Innovation, with averages above 8, and Ministries of Culture and Sport or Defence, with an average of less than 6.5), they are not statistically significant. [44]

[43] See Methodology, section 2.2.

[44] $p > 0.1$ in Kruskal-Wallis non-parametric test, with Bonferroni adjustment.

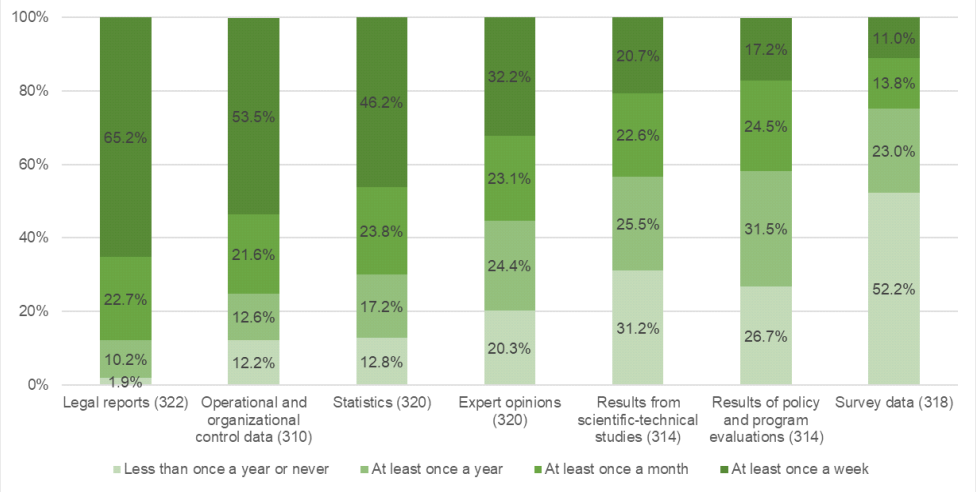
Table 6. CONESPOL-PUB survey: population, participants and respondents by ministry

Ministry	Abbreviation	Population	Participants	Respondents	Response rate (%)
Min. of Agriculture, Fisheries and Food	MAPA	51	51	19	37.3
Min. of Economic Affairs and Digital Transformation	MAETD	68	65	18	27.7
Min. of Foreign Affairs, European Union and Cooperation	MAEUEC	82	80	16	20.0
Min. of Science and Innovation	MCINN	24	24	10	41.7
Min. of Consumer Affairs	MCON	18	16	4	25.0
Min. of Culture and Sports	MCD	37	34	9	26.5
Min. of Defence	MDEF	48	45	16	35.6
Min. for Social Rights and the 2030 Agenda	MDSAG	28	29	14	48.3
Min. of Education and Vocational Training	MEFP	34	32	12	37.5
Min. of Finance and Civil Service	MHFP	159	152	44	28.9
Min. of the Presidency, Relations with the Parliament, and Democratic Memory	MPRES	30	30	6	20.0
Min. for the Inclusion, Social Security and Migration	MISSM	43	42	19	45.2
Min. of Industry, Trade, and Tourism	MICT	47	47	21	44.7
Min. of Interior	MINT	58	56	26	46.4
Min. of Justice	MJUS	45	25	13	52.0
Min. of Equality	MIGU	19	18	4	22.2
Min. of Territorial Policy	MPT	30	31	13	41.9
Min. of Health	MSAN	38	34	6	17.6
Min. of Labour and Social Economy	MTES	24	23	9	39.1
Min. of Transport, Mobility, and Urban Agenda	MTMAU	64	56	20	35.7
Min. of Universities	MUNIV	15	16	8	50.0
Min. for Ecologic Transition and the Demographic Challenges	MTERD	50	46	17	37.0
Total		1012	952	324	34.0
Average (ministries)					35.5
Standard deviation (ministries)					10.3

Source: CONESPOL-PUB survey. Note: The 'Respondents' column refers to the responses obtained after the process of cleaning, that is, after the elimination of incomplete or anomalous responses (those where an automatic response pattern was recorded throughout the questionnaire or several blocks of questions, or where the total completion time of the questionnaire was below the 5th percentile).

The frequency of actual use of scientific evidence by ministerial decision-makers is significantly lower than that of other types of information (Figure 10). While only 21% of respondents claimed to use results of scientific and technical studies at least once a week, the percentage was 65.2% for legal reports or 53.5% for operational or organisational control data. In contrast, the frequency of use of scientific research results is somewhat higher than the results of programme or policy evaluations (17.2% of respondents at least once a week) and considerably higher than the use of surveys. Finally, almost one third of respondents (32.2%) say they have recourse to expert opinions at least once a week, although, as we will see, they are not necessarily expert academic staff.

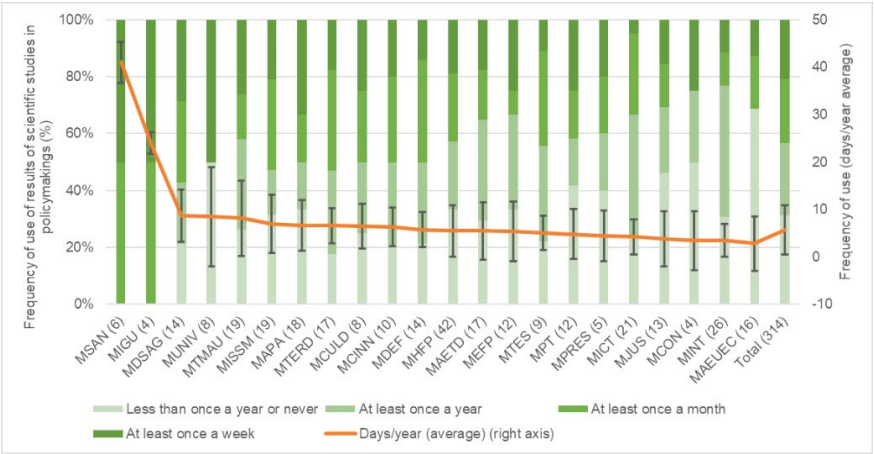
Figure 10. Frequency of use of results from scientific studies compared to other types of information



Source: CONESPOL-PUB Survey. Note: Question C17 – "In your work, how often do you use the following information resources?" The number in parentheses on the horizontal axis indicates the number of responses (by ministry or total).

Therefore, there is a certain positive correlation between preferences for the use of scientific evidence and its actual use, although this is lower than desired. [45] On the other hand, if we measure the frequency of use by the different government departments (Figure 11), [46] we see differences between departments, particularly between the Ministry of Health (MSAN) and Equality (MIGU), where half of its managers use this information input at least once a week, and the rest. Yet differences are not statistically significant.

Figure 11. Frequency of use of scientific research results by ministry



Source: CONWESPOL-PUB survey. Note: Question C17 –'In your work, how often do you use the following information resources: data from scientific and technical study results?' The number in parentheses on the horizontal axis indicates the number of responses (per ministry or in total). The line represents the mean usage in days per year along with error bars for the standard deviation obtained

The same applies to the use of results from public policy evaluations (Figure 12), although we note that there are changes in the departments that have the most frequent use of this type of information (Ministry of Integration, Social Security and Migration (MISSM), universities (MUNIV), health (MSAN) and defence (MDEF)). In any event, as is the case with the results of scientific research, their use is below the

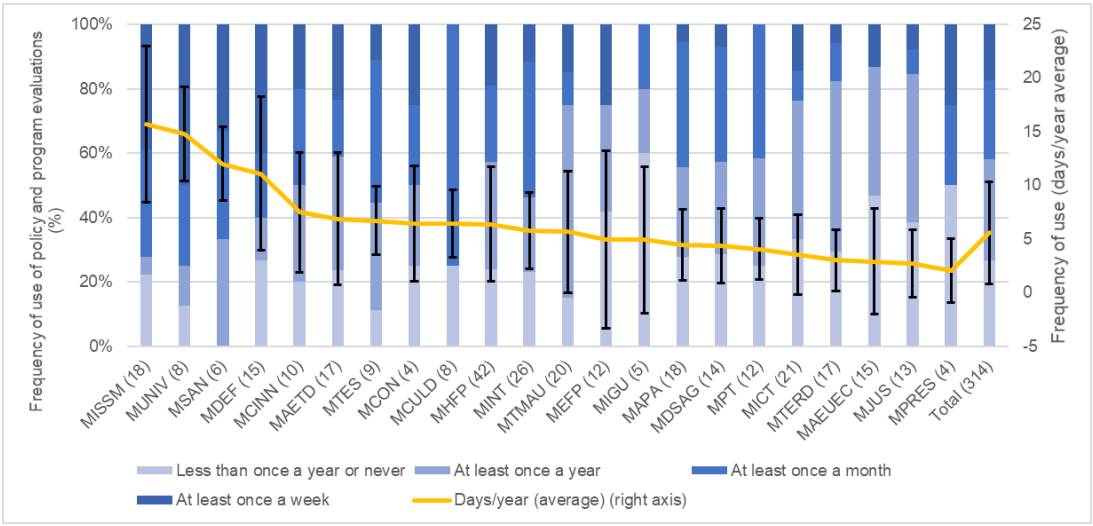
[45] On returning both variables (preferences as an independent variable and, as a dependent variable, the frequency of use of scientific research results, transformed to the logarithm of the average number of days), the resulting equation is y=0.51+0.17x. On the correlation, Rho de Spearman=0.270 (p<0.001).

[46] The frequency of use per ministry was recorded in two ways: ordinal (weekly, monthly, annually or less frequently); and number of days per year. This variable is calculated by assigning a fixed number of days to each of the ordinary frequency responses indicated by the respondents. Those reporting a daily frequency were allocated a total of 240 days (assuming a work schedule of 5 days per week and 4 weeks of leave); weekly, 48 days; monthly, 12 days. Those who reported a frequency of at least once a year were allocated 3 days, so that 1 day could be allocated to those who report a use, but less frequently than once a year. Finally, those claiming no use are assigned a value of 0.

other information inputs assessed in the CONESPOL-PUB questionnaire, with the exception of data from surveys (Figure 10).

To conclude, the CONESPOL-PUB survey also contained a question to assess the type of use made of scientific evidence. The question distinguished four types of use, which fit within the main functions of scientific knowledge in the public policy process (e.g. Boswell 2009, Pelz 1978, Rich 1991, Weiss 1977). The first type of use is the instrumental, consisting either of (a) the use of scientific evidence to diagnose problems, rethink objectives, or (b) to improve the effectiveness of policy instruments. The other type of use is political-symbolic, where scientific evidence is used as a resource to (c) justify ex post decisions made on other bases (ideology, interests); or (d) to legitimize the organisation itself (reinforcing the appearance of rationality of decision-making processes).

Figure 12. Frequency of use of programme and policy evaluations by ministry.

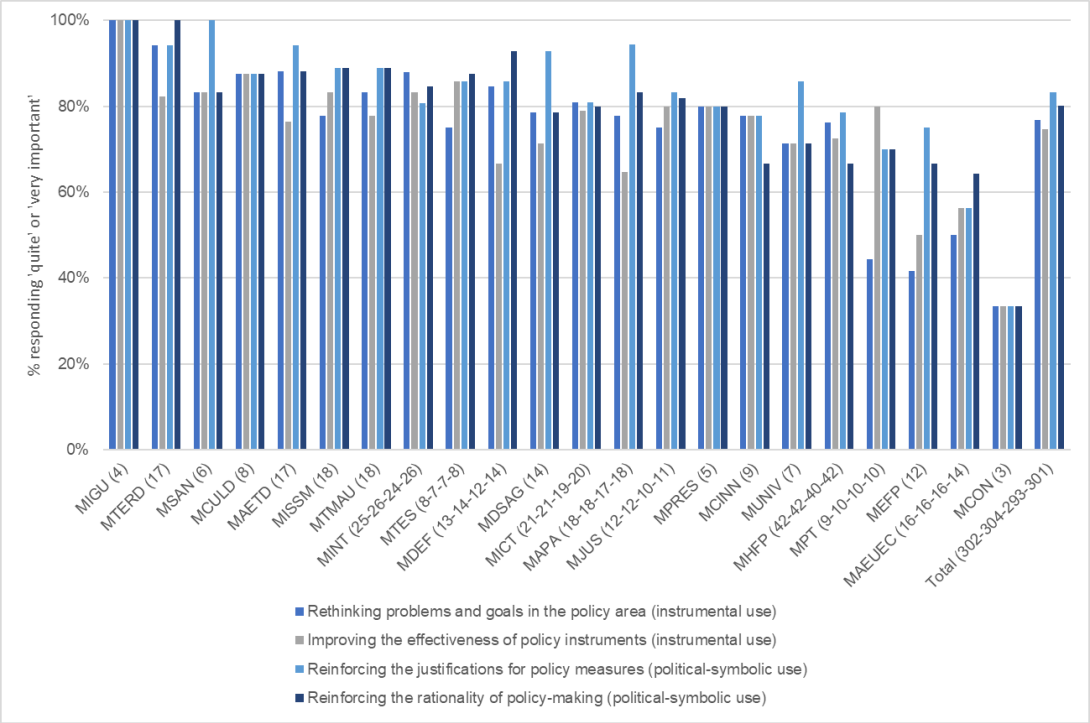


Source: CONESPOL-PUB Survey. Note: Question C17 – "In your work, how often do you use the following information resources: program or policy evaluation results?" The number in parentheses on the horizontal axis indicates the number of responses (per ministry or in total). The line represents the mean usage in days per year along with error bars for the standard deviation obtained.

The GAS's senior officials and managers regard the symbolic political functions of scientific evidence in policymaking as the most important, although the differences with regard to instrumental functions are very small (Figure 13). Therefore, 83.2% of respondents consider that the use of the results of technical scientific studies is of considerable or high importance to strengthen the justification for the measures adopted, while 80.1% point to their importance in the rational legitimacy of the decision-making process. By contrast, the percentages of respondents who underline the importance of scientific evidence in rethinking the problems or objectives or improving the effectiveness of the instruments used in public policy are 76.8 and 74.7% respectively (Figure 13, total columns).

These results show that there is no clear differentiation between instrumental and political-symbolic functions in the use of scientific evidence, although some ministries show marked differences (Figure 13). In Education and Vocational Training (MEFP), only half of the respondents stress the importance of the instrumental use of scientific evidence (41.7% think it is important to rethink problems or objectives and 50% to improve the effectiveness of instruments), while the proportions of those who consider the use to justify decisions already taken or the legitimacy of the decision process are 75% and 66.7% respectively. Similar differences exist in the Ministry of Agriculture, Fisheries and Food (MAPA) or the Ministry of Social Rights and Agenda 2030 (MDSAG), where the use of decisional justification is highlighted. We also see a significant contrast between the instrumental and political use in the Ministry of Defence, as two thirds (66.7%) of the ministerial officials surveyed in this Ministry consider that scientific evidence is important to improve the effectiveness of the instruments used, with 92.7% stressing the importance for the legitimacy of decisions and 85.7% for the justification of decisions taken.

Figure 13. Functions of results of scientific and technical studies in public policies by ministry



Source: CONESPOL-PUB Survey. Note: Question P14 – "Within the policy area that falls under your unit, and based on your experience, how important are the data derived or obtained from scientific and technical studies when it comes to...?" The bars on the graph indicate the percentage of respondents who answered that the corresponding function is of 'quite or very high importance.' The numbers in parentheses on the horizontal axis indicate the number of responses for each item (per ministry or in total).

This section has focused on the use by senior management and managers of the AGE of scientific evidence and policy assessment products in public policymaking:

- Their use is lower than other inputs, such as legal reports, organisational data or statistics;
- This use varies depending on the Spanish government departments;
- And, finally, that the use of scientific evidence has a political-legitimising function rather than an instrumental one.

4.2 Consulting academic expert staff

The transfer of scientific knowledge to public policymaking and decision-making processes by the senior and managerial staff of the AGE also materialises through direct recourse to expert staff opinions (Figure 10). Almost one third (32.2%) of respondents used this input at least once a week, and another 23.1% at least once a month. However, it must be held that such opinions may relate both to the provision of substantive scientific and technical information and to the provision of opinions and arguments of an assessment or normative nature. Unfortunately, the CONESPOL-PUB survey does not distinguish between the two types of information.

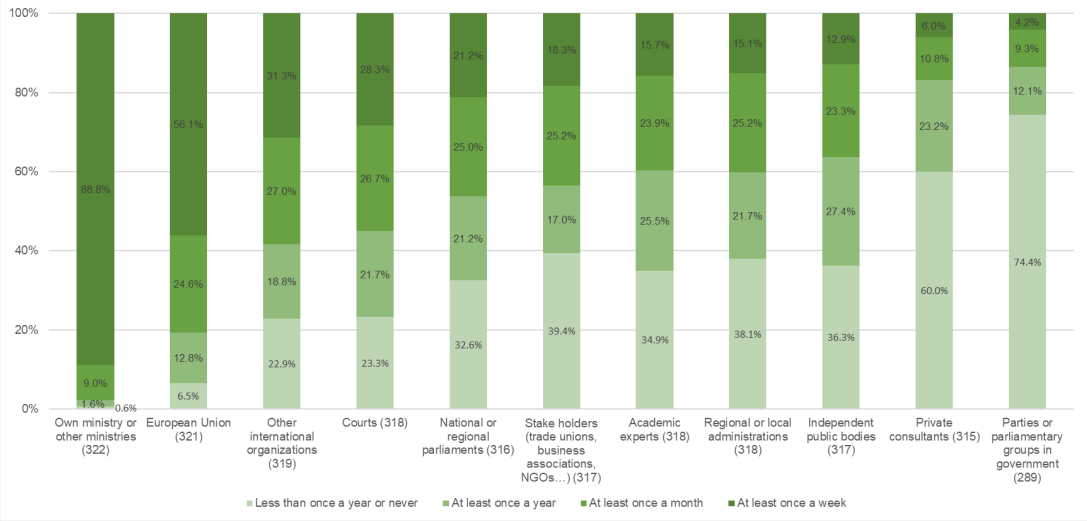
What it does allow is to assess to what extent information from academic experts is used compared with other sources. Although it is not directly comparable with the question on the use of academic opinions, as the interest lies more in the source of inputs (academic expert) than in the type of input (expert staff opinions). [47]

Ministries use information and documents from academic expert staff less frequently than that produced within the AGE itself or the EU, from other international bodies, courts of justice, parliaments or trade unions, employers' organisations or other social organisations. On the other hand, it sits above the

[47] In fact, each question is part of a different block of the questionnaire.

information provided by other territorial administrations (regional or local), independent public bodies, private consultants or the governing party itself (Figure 14).

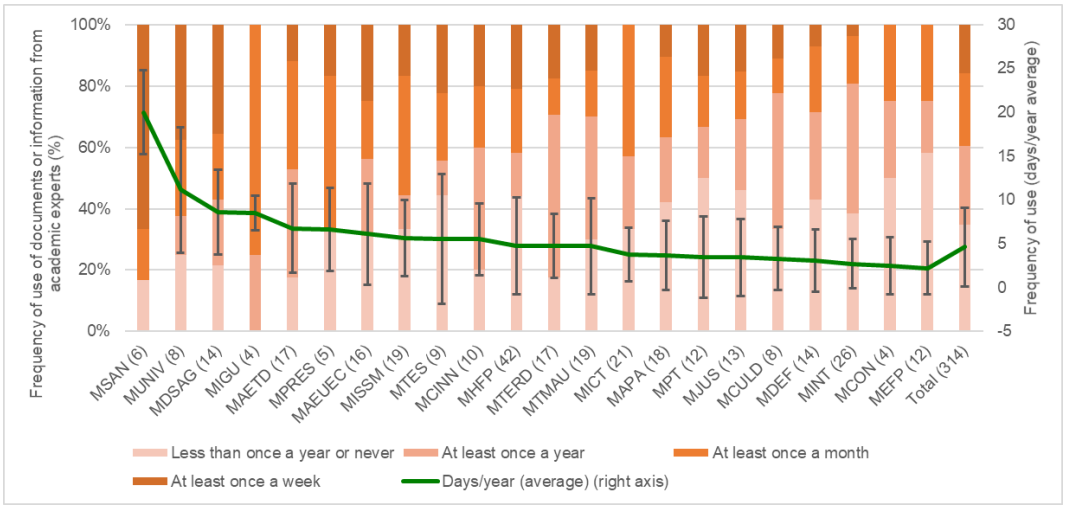
Figure 14. Frequency of use of information sources by high-level officials and directive staff of the General Administration of the State



Source: CONESPOL-PUB Survey. Note: Question C18 – "In your work, how often do you resort to documents or information from...?" The numbers in parentheses on the horizontal axis indicate the number of responses for each item.

Regarding the use of information from academic experts per ministry, Figure 15 shows important differences between ministries, especially in the weekly use of this source by the Ministry of Health (MSAN), the Universities (MUNIV) and the Ministry of Social Rights (MDSAG) compared to the rest. [48] The percentage in these ministries of respondents who say they use documents or information from academic expert staff at least once a week is 66.6, 37.5 and 35.7%, respectively. By contrast, the same average percentage in the other ministries is 12.3%, with some such as Equality, Industry, Consumer Affairs and Education and Vocational Training, where none of the line managers use this type of source on a weekly basis.

Figure 15. Frequency of use of documents and information from expert academic staff by ministry



Source: CONESPOL-PUB Survey. Note: Question C18 – "In your work, how often do you resort to documents or information from...?" The numbers in parentheses on the horizontal axis indicate the number of responses for each item (per ministry or in total). Error bars represent the standard deviation of the frequency measured in days per year.

[48] For the Ministries Health and Social Rights the difference is statistically significant, according to the adjusted standardised waste.

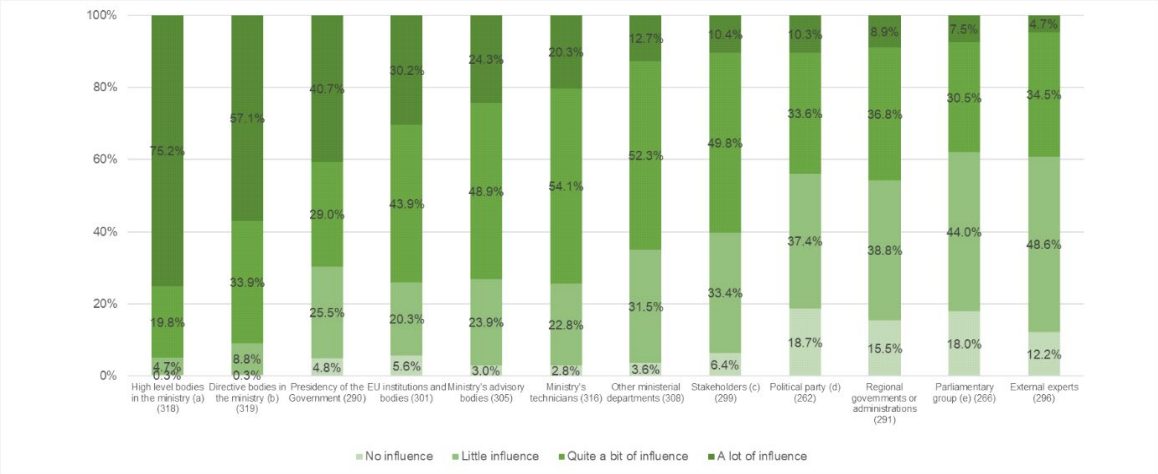
In short, this section has shown that:

- Except for some ministries, it is not common for senior officials and managers in the AGE to rely on data or information from academic experts.
- The percentage of respondents who use data and information from academics on a monthly basis is similar to those who use results from scientific-technical studies (40%). [49]
- Not everyone who frequently consults with experts turns exclusively to academic experts.

4.3 Influence on public policies of external expert staff and the BCAFS of the Spanish government departments.

Finally, the CONESPOL-PUB survey contained a question about the influence of different stakeholders on the public policy design process, including the categories of 'external experts' and 'the BCAFS of the Spanish government departments (Figure 16). The senior officials and managers of the GAS underlined the influence of the internal stakeholders of their ministries, with a pattern marked by the internal hierarchy. Thus, senior bodies (ministers and state secretaries) and governing bodies (secretaries-general, directors-general and deputy directors-general) have 'a lot of influence' in the design of policies for 75.2% and 57.1% of respondents, adding those who consider that they have a 'quite a bit of influence', the total figures for the ministerial top would be 95 and 90.9% respectively.

Figure 16. Perception of the influence of by various types of actors on public policy design



Source: CONESPOL-PUB Survey. Note: Question P16 – "In the area where your unit is competent and based on your experience, what degree of influence do the following have on policy design...?" The numbers in parentheses on the horizontal axis indicate the number of responses for each item. The response options in the following categories included the following clarifications: (a) Ministers and secretaries of State; (b) General Directors, Deputy General Directors, Undersecretaries, General Secretaries; (c) Actors or social organizations interested in politics; (d) Political party to which the minister belongs or which sponsored their appointment; (e) Parliamentary group of the political party to which the minister belongs or which sponsored their appointment.

It should be noted that a large majority of the top management and senior staff within the GAS can be considered as experts on matters within their competence. 38.2% of respondents said that all positions they had previously occupied were directly related to the specific subject areas for which the body or unit they decided was responsible. In addition to these, a further 50% replied that some of the previous positions were related.

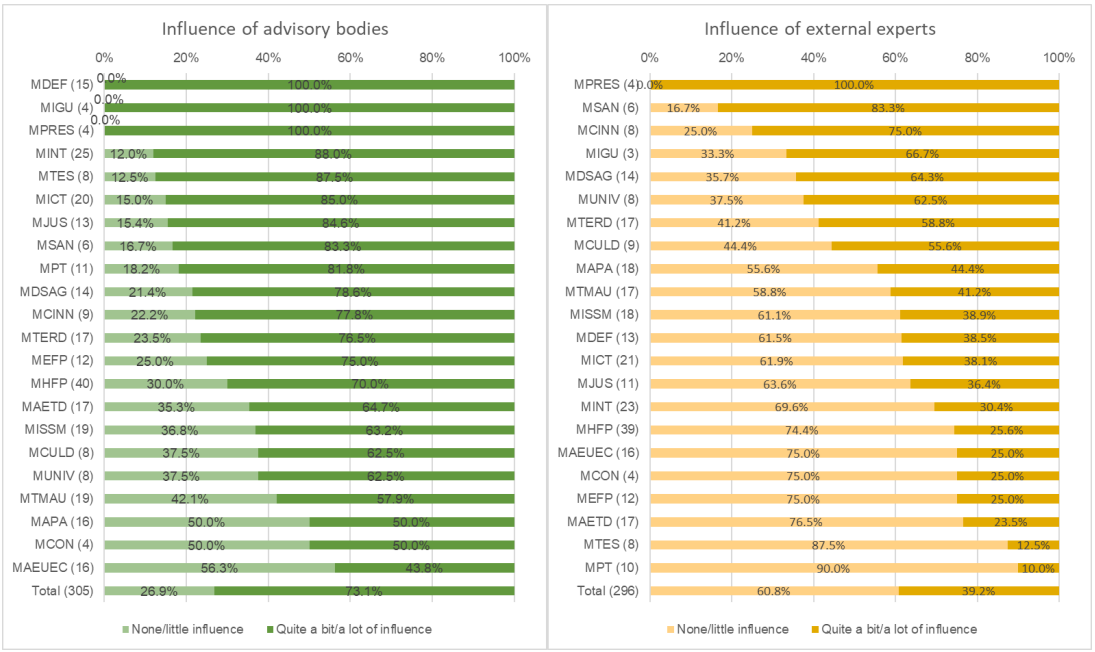
After the ministry's top management and senior staff, almost 41% of respondents consider the Presidency of the Government to be very important in the policy design of their area. However, when adding those who consider this actor to be quite important, the overall percentage (69.7%) remains below the figures for ministry technicians (74.4%) and the BCAFS of the Spanish government departments (73.1%), although in both cases the proportion of those who consider these stakeholders to be very influential is lower than for the presidency (20.3% and 24.3% respectively). In addition, the EU institutions and agencies are identified as bodies with a significant influence on policy design: 30.2% and

[49] The correlation between the two variables, measured by the average daily annual use per ministry, is 0.854 (p>0.000).

an additional 43.9% of senior management interviewed perceive as very or fairly influential in policy design.

Regarding the perception of the influence of the consultative bodies of the Spanish government departments (see section 3.3), the above data underline their importance in policymaking. However, the assessment of the influence of BCAFs contrasts between ministries (Figure 17). For example, in the Ministry of Defence (MDEF), the Ministry of Equality (MIGU) and the Ministry of the Presidency (MPRES), all respondents consider that these bodies have quite a lot or a great deal of influence. On the other hand, in the Ministry of Agriculture (MAPA) and the Ministry of Consumer Affairs (MCON) this proportion drops to 50%, and in the Ministry of Foreign Affairs (MAEUEC) it drops to 43.8%. However, there are not statistically significant differences. [50]

Figure 17. Influence of advisory bodies and external experts on public policy design by ministry



Source: CONESPOL-PUB Survey. Note: Question P16 – "In the area where your unit is competent and based on your experience, what degree of influence do advisory bodies (left) or external expert personnel (right) have on policy design?" The numbers in parentheses on the vertical axes indicate the number of responses for each item (per ministry and in total).

In contrast to the perceived influence of BCAFs, Figure 16 above shows that very few senior officials and managers of the GAS consider external expert staff to be influential. It should be recalled that this concept includes not only academic scientific staff, but also any person outside the public administrations with expertise in the area of competence of the administrative body. Therefore, the percentage of respondents who consider external expert staff to be highly influential is the lowest of all (4.7%) and, together with those who consider that they have significant influence, the resulting percentage (39.2%) only slightly exceeds the parliamentary group of the party to which the minister belongs or who has sponsored their appointment (38%).

In addition, there are statistically significant differences between ministries in the assessment of the influence of external expert staff (Figure 17). [51] For the Ministry of the Presidency, the Ministry of Health (MSAN) and the Ministry of Equality, 75% or more of the ministerial officials surveyed (100% for the Presidency) consider that external experts have 'a lot' or 'quite a bit' of influence on the design of policies in their areas of competence. In contrast, in the Ministry of Territorial Policy (MPT) and the Ministry of Labour (MTES), this proportion is only 10-12.5%, while in four other departments (Economic Affairs (MAETD), Education (MEPF), Consumer Affairs (MCON), Foreign Affairs (MAEUEC) and Finance (MHFP)) it is barely 25%.

[50] Chi-square=46.407, p=0.296.

[51] Chi-square=62.31, p=0.022.

In summary, this section has shown that, according to the GAS's senior officials and managers:

- The most influential stakeholders in the policy process are to be found primarily within the ministries themselves;
- Within these, advisory bodies are often perceived as highly influential; and
- On the contrary, the influence of external expert staff (including scientific and academic staff), with the exception of some specific ministries, is usually much more limited.

4.4 Use of knowledge: summary of main results

These results raise a number of interesting questions for assessing the relationship between drafting and designing GSA policies and the science advisory ecosystem.

- Of the different types of information produced in this advisory ecosystem (excluding legal reports, which are likely to have been drafted within the administration itself), senior officials and managers of the GAS tend to use less developed inputs (statistical data) more frequently, while those involving a greater degree of external intervention in their development (results of scientific-technical studies, results of policy evaluations, expert opinions) are used less frequently.
- The role of expert academic staff as a source of information for senior officials and managers of the GAS is clearly less important than that of information produced within the administrative structure itself, with a clear preference for intra-mural or EU sources.
- Although policymakers in the GAS tend to prefer information produced by academic experts well above, for example, that from external private consultants.
- The use of information provided by academic staff is at similar levels to that provided by social partners, territorial administrations or independent public bodies.
- The perceived influence of expert advice (including advice on science and academia) on public policymaking is greater when channelled through the BCAFs structure of the Spanish government departments. On the other hand, the perceived influence is drastically reduced if the advice comes directly from expert staff outside the structure of the GAS.
- Scientific-technical knowledge used in the policy process is both instrumental and political-legitimate, but the latter seems to matter more to a larger proportion of respondents, especially in some ministries.

5 Final reflections: opportunities and challenges for the consolidation of the Spanish scientific advisory ecosystem

According to the ranking of Scimago countries, [52] measured on the basis of the number of scientific publications, Spain ranks 11th out of a total of 243 countries, for the period 1996-2022. Taking into account the citations received per published paper, Spain rises to 8th place (Scimago 2023). These data reflect the high quantity and quality of scientific knowledge produced by Spain. In the context of this report, the most relevant aspect of these data is the potential of the knowledge generated by and available to Spanish society to improve itself, to face its socio-political challenges and to play a leading role in the field of international science diplomacy. The data also reflect the high level of training and preparation of R&D staff in the Spanish scientific system.

We have analysed the mechanisms, institutions and stakeholders that in Spain contribute to integrating scientific and expert knowledge into the country's governance, as well as studying the effective use made of it. We can certainly talk about the **existence of an ecosystem of scientific and expert advice in the process of shaping, implementing and evaluating public policy in Spain**. It is a **rich and diverse** ecosystem, involving many interlinked stakeholders with a variety of roles and functions, which, as we have seen and according to the conceptual framework used, range from supporting the understanding of problems and policy choices, to representation at the international level, to assessment, support for dealing with emergencies, foresight analysis and strategy.

Some features of this emerging ecosystem open up an interesting scenario of opportunity, consolidation and progress for the imminent future. First of all, it is worth highlighting the **relevant institutional innovations of the last 3 years to integrate scientific and expert advice into the structures of the executive and legislative powers**. This integration has taken place, in the executive branch, through the creation of the National Office for Foresight and Country Strategy (2020) within the Presidency of the Government, which complements the advisory work carried out in the various ministries by the numerous bodies with consultative and advisory functions (BCAFs). In the legislative branch, the integration of science advice has taken place through the creation of the Office of Science and Technology of the Congress of Deputies (2021). Both institutional innovations help improve governance, foster a culture of public policy advice and position Spain in the circuits and networks of international advisory bodies, such as the EPTA network (*European Parliamentary Technology Assessment*) of parliamentary scientific advisory offices, in which the Spanish Congress joined in November 2021. For its part, the National Foresight and Strategy Office is today a regular interlocutor with the European Commission and its creation has helped to put Spain at the third place (together with six other countries, including Canada, Sweden and the United States) in the strategic planning indicator, in a ranking of 41 countries, as part of the 2022 Sustainable Governance Indicators. [53] We consider that this dimension of openness and dialogue with the European institutions in the field of policy advice and evaluation is particularly relevant, which is essential to further cultivate in order to align the future developments in our advisory ecosystem with those taking place in our environment. It should be noted, however, that to date and since its creation in 2015, the European Commission's Scientific Advice Mechanism (SAM) and its Group of Chief Scientific Advisors (GCSA) has not yet been attended by any Spanish scientists.

Together with the milestone of the creation of both entities, the last 2 years have seen the **adoption of a series of rules that contribute to strengthening the scientific advisory ecosystem**, such as the Law on Science, Technology and Innovation and the Transfer and Collaboration Plan or the Law on Institutionalisation of Public Policy Assessment in the Central State Administration, among others. The Law on the Institutionalisation of Evaluation reflects the emergence of a culture of evaluation and advocacy for policy design that takes into account the available scientific evidence, among the many factors to be considered in the political approach to complex problems.

The high level of institutional and regulatory production reflects the **commitment and awareness of institutions and the political establishment** to avail themselves of expert knowledge for use in designing public policies, which, combined with the **development and commitment of the scientific community and institutions** to provide this knowledge, are two essential requirements for the

[52] SCImago, (n.d.). SJR – SCImago Journal & Country Rank. http://www.scimagojr.com, accessed on 03/09/2023.

[53] Sustainable Governance Indicators (2023) Strategic planning. https://www.sgi-network.org/2022/Good_Governance/Executive_Capacity/Strategic_Capacity/Strategic_Planning, accessed on 03/09/2023.

consolidation of a scientific advisory ecosystem. Indeed, scientific institutions such as the CSIC are working towards a greater institutionalisation of the advice provided by their scientific staff in a wide range of fields and functions.

The scenario opened up by recent developments therefore lays the foundations for a consolidation of the science advisory ecosystem, all the more so if we take into account the high level of capacity within the scientific system as well as in public administrations and Parliament, which was highlighted in most of the consultations and interviews carried out for this report.

But this context of opportunity should not obscure the fact that there are still important challenges for the institutional consolidation of the system. The high empowerment of stakeholders, for example, does not exempt the **need for specific training for dialogue and knowledge sharing between the scientific and political spheres, or for the exercise of responsibilities in the field of scientific diplomacy**. To date, according to the analysis carried out, there are few stakeholders in the advisory ecosystem that have such specific competences and further professionalization of the exercise of science advice would be desirable. It would also be good to **advance recognition in the research assessment frameworks to reward public policy advisory activities**. This highlights Spain's broad commitment to the reform of EU-led research evaluation systems in the context of the European Research Area policy agenda. [54]

The recent nature of some of the most relevant initiatives that have helped to structure the Spanish science-for-policy ecosystem inevitably means that the ecosystem is still fragile. In order to combat this fragility, it is **necessary to maintain the political momentum, regardless of the ideology of government or short-term changes in government priorities.**

Another challenge facing the emerging system is the progressive consolidation and reinforcement of a culture that attaches importance to incorporating scientific evidence and evaluation in the political decision-making and public policy design process. The data collected shows a generally positive outlook (at least within the Spanish government) towards improving the use of scientific evidence for policymaking. However, the analysis of the use of this evidence leaves no doubt that there is scope for boosting the culture of policies based (or informed) on evidence and policy evaluation. The aim is for public decision-makers to take the benefits that science advice can have for policymaking seriously, not only from the point of view of its legitimation, but also as a tool for its improvement. Measures such as the inclusion of these issues in the training of management and public employees as well as Members of Parliament could contribute to this objective. This would strengthen the promotion 'of the evidence-based public policymaking' culture driven from the private sector by other stakeholders, particularly think tanks such as COTEC or EsadeEcPol.

For the emerging culture to settle and science advice to be successfully developed and taken into account, an adequate **design of additional governance and interface structures, beyond the consolidation of existing ones, is also required.** While there is a large population of BCAFs, it is recognised that an important part of the advice takes place through informal channels that are not always operational. There is therefore room for the creation of new structures connecting the existing expert knowledge potential in science and academia with the needs of public decision-makers. The specific design of such structures will depend on the characteristics of each sector (political priority, conflicting issues, consensus in the scientific community, degree of uncertainty, etc.). Any design should ultimately lead to strengthening the legitimacy of decision-making processes in three key aspects (Parkhurst 2017): quality and relevance of the evidence to the issues in question; maintaining the priority of the principle of democratic representation as the basis of the authority in the decision; and selection procedures of that evidence that consider the diversity and variety of evidence available. The success of these structures would also be to equip them with well-trained and knowledgeable professionals from both the scientific and policymaking spheres, which would mean opening up a **new niche of professional specialisation** in science careers.

Cultural change must also necessarily come hand in hand with the construction of collective intelligence with active participation of society. This involves not only considering the different social and economic interests at stake or the shared general social objectives in the advice, but also incorporating citizen

[54] 70 Spanish organisations have signed the agreement of the Coalition for Advancing Research Assessment (CoARA). Together with 455 other institutions around the world, they are committed to increasingly diversify the contributions from research staff to society through research assessment. For more information, see https://coara.eu/.

involvement, which can bring other valuable types of evidence such as local knowledge or citizen *expertise* (Krick 2022). This is about **connecting the advisory ecosystem with society**.

The need to involve citizens is linked to the pending task of **improving the governance of data** by the AGE, in order to facilitate access to and re-use of data by research staff and other citizens. Despite the progress made since the adoption of the Law on Transparency, Access to Information and Good Governance in 2013, [55] there are still problems such as limits on accessing key data for diagnosing problems or evaluating policy, as well as the rigidity of data structures and formats, and the lack of awareness by data-producing bodies of the possibility of their use beyond internal organisational use. As a matter of hope, the Fourth Open Government Plan has echoed this problem, including in its Transparency and Accountability axis the commitment to boost data openness and the re-use of public sector information.

The challenges to be overcome are neither few nor straightforward, but neither were those that have been overcome for the emergence of what is already an interconnected ecosystem of institutions and stakeholders committed to making the most of scientific and technical knowledge in the field of public policy. Spain certainly has the necessary background and a sufficient internal and European opportunity structure to take advantage of the efforts made to date. **Strengthening the scientific and technical advisory ecosystem will only benefit the functioning of our democracy and our international positioning**.

[55] In 2022, the access to information indicator of the Sustainable Governance Indicators project of the Bertelsmann Foundation placed Spain at the same level as countries such as Germany, France or the United Kingdom, with 8 points out of 10. This score indicates the existence of a legal regulation for access to official information, with justified restrictions, and where access is sometimes complicated by bureaucratic problems. There are also appeal and monitoring mechanisms that allow citizens to exercise their right of access. See Sustainable Governance Indicators (2023) https://www.sgi-network.org/2022/Robust_Democracy/Quality_of_Democracy/Access_to_Information/Access_to_Government_Information, accessed on 03/09/2023.

References

Abelson, D. E. (2018). Do Think Tanks Matter? Assessing the Impact of Public Policy Institutes (3rd ed.). McGill Queen's University Press, Montreal.

Arriazu, R. (2015). La importancia de la evaluación en las Políticas Públicas Españolas: una aproximación histórica basada en el método biográfico. *Revista de Estudios de La Administración Local y Autonómica*, Agosto, pp. 209–220, https://doi.org/10.24965/reala.v0i3.10248.

AIReF. (2017). *Plan de Acción de la revisión del gasto en subvenciones del conjunto de las Administraciones Públicas (Spending Review)*. AIReF (Autoridad Independiente de Responsabilidad Fiscal). http://www.airef.es/documents/10181/400912/AIReF+Plan+de+Acción+Spending+ReviewAprobado+por+ACM+.pdf/5b1cec14-3365-43a6-8b96-648d89e82a90.

AIReF. (2018). Plan de acción de la revisión del gasto conjunto de las Administraciones Públicas (Fase II) (Spending Review) (Issue Fase II). AIReF (Autoridad Independiente de Responsabilidad Fiscal).

AIReF. (2020). *Plan estratégico 2020-2026*. AIReF (Autoridad Independiente de Responsabilidad Fiscal).

AIReF. (2021a). *La Institucionalización de la Evaluación de Políticas Públicas en Castilla y León:situación actual y propuestas*. Autoridad Independiente de Reponsabilidad Fiscal. https://www.airef.es/es/centro-documental/la-airef-publica-el-estudio-la-institucionalizacion-de-la-evaluacion-de-politicas-publicas-en-castilla-y-leon-situacion-actual-y-propuestas/.

AIReF. (2021b). Plan de Acción de la revisión del gasto del conjunto de las Administraciones Públicas (Spending Review Fase III). AIReF (Autoridad Independiente de Responsabilidad Fiscal).

AIReF. (2022). Plan de Acción de la revisión de gasto conjunto de las Administraciones Públicas (Spending Review 2022-2026 Fase I). AIReF (Autoridad Independiente de Responsabilidad Fiscal).

Böhle, K., and Moniz, A. (2015). No Countries for Old Technology Assessment? Sketching the Efforts and Opportunities to Establish Parliamentary TA in Spain and Portugal. *EconStor* Open Access Articles, pp. 29-44.

Official State Gazette (2001) Royal Decree 375/2001, of 6 April, approving the Statute of the Instituto de Salud "Carlos III". Núm. 101 de 27 de abril de 2001, Reference: BOE-A-2001-8157.

Official State Gazette (2015) Real Decreto 925/2015, of 16 October, por el que se aprueba el Estatuto del Instituto Nacional de Técnica Aeroespacial «Esteban Terradas». Num. 249 of 17 October 2015, Sec. I. Pág. 96707 and ff.

Official State Gazette (2018) Resolution of 11 December 2018, of the Secretaría General de Coordinación de Política Científica, publishing the Statutes of the Public Consortium Instituto de Astrofísica de Canarias, Num. 307 of 21 December, Sec. III., pages 125743 and ff.

Official State Gazette (2021) Royal Deccree 202/2021, of 30 March, reorganizing certain publicc research bodies of the State General Administration and modifying Royal Decree 1730/2007, of 21 December, creating the State Agency Consejo Superior de Investigaciones Científicas and approving its Statute, and Royal Decree 404/2020, of 25 February, developing the basic organizational structure of the Ministry of Science and Innovation. Num. 77, of 31 March 2021, Sec. I., pages 36471 and ff.

Official State Gazette (2022) Law 17/2022, of 5 September, modifying Law 14/2011, of 1 June, of Science, Technology and Innovation. Num 214 of 6 September 2022. Reference: BOE-A-2022-14581.

Official State Gazette (2022) Law 27/2022, of 20 December, of Institutionalization of public policy evaluation in the State General Administration. Num. 305 of 21 December 2022. Reference: BOE-A-2022-21677

Official State Gazette (2023) Royal Decree 97/2023, of 13 February, modifying Royal Decree 662/2022, of 29 July, re-structuring the Presidency of the Government. Num.38 of 14 February 2023, Section I, pages 22398 and ff.

Boswell, C. (2009). *The Political Uses of Expert Knowledge. Immigration Policy and Social Research*. Cambridge University Press, https://doi.org/10.1017/CBO9780511581120.

Bustelo, M. (2020). Spain. In R. Stockmann, W. Meyer, y L. Taube (Eds.), *The Institutionalisation of Evaluation in Europe*, pp. 303–327, Palgrave Macmillan, https://doi.org/10.1007/978-3-030-32284-7.

Bustelo, M.; Salido, O.; Pérez, P.; Pajares, L. and Segura, L. (2021) *Análisis de la convocatoria piloto del sexenio de transferencia e innovación 2018 desde una perspectiva de género*, Ministerio de Universidades, NIPO: 097210042.

Cabrales Goitia, A., and Rey Biel, P. (2021). Mas allá de los nudges: Políticas públicas efectivas basadas en la evidencia de las ciencias del comportamiento. *Gestión y Análisis de Políticas Públicas*, 38–45. https://doi.org/10.24965/gapp.i25.10864.

Cañibano, C. (2023) Asesoramiento científico-técnico al poder legislativo: la emergencia de la Oficina de Ciencia y Tecnología del Congreso de los Diputados español, in Pavone, V.; Molas, J.; Brandts, J. and Serrano, R. (coords.) (2023) *Ciencia para las políticas públicas. Informe de Transferencia de Conocimiento*. Colección Science 4 Policy, pp. 32-37, Consejo Superior de Investigaciones Científicas, Madrid, https://doi.org/10.20350/digitalCSIC/15365.

Casado, J. M., and del Pino, E. (2022). Similitudes y diferencias en la evaluación de políticas públicas en ocho países: España en perspectiva comparada. *Papeles de Economía Española*, 172, pp. 2–17.

Castelló-Sirvent, F., and Roger-Monzó, V. (2021). Spanish think tanks during periods of crisis and economic recovery: An analysis of media concentration. *Revista Española de Investigaciones Sociológicas*, 174(April-June), pp. 23–46, http://dx.doi.org/10.5477/cis/reis.174.23.

Castro, E.; Cañibano, C.; Giménez, E.; Olmos, J. and Perruchas, F. (2022) Análisis de la primera convocatoria del sexenio de transferencia de conocimiento e innovación, focalizado en dos tipos de aportaciones, ANECA, Madrid, NIPO: 029220051. https://www.aneca.es/documents/20123/81602/Informe-Sexenios_Transferencia_NIPO.pdf/

Colino, C. (2020). Decentralization in Spain: Federal Evolution and Performance of the Estado Autonómico. In D. Muro and I. Lago (Eds.), *The Oxford Handbook of Spanish Politics*, pp. 62–81,. Oxford University Press, Oxford.

Costas Pérez, E., and Tucat, P. (2021). Nudges : diseño y evaluación. *Gestión y Análisis de Políticas Públicas*, 25(marzo). Monographic number – Los nudges y el diseño conductual de políticas públicas. pp. 8-22. DOI: https://doi.org/10.24965/gapp.i25.10868 –8–22.

Craft, J., and Howlett, M. (2013). The dual dynamics of policy advisory systems: The impact of externalization and politicization on policy advice. *Policy and Society*, 32(3), pp. 187–197. https://doi.org/10.1016/j.polsoc.2013.07.001.

Cruz-Castro, L., and Sanz-Menéndez, L. (2005). Politics and institutions: European parliamentary technology assessment. *Technological Forecasting and Social Change*, 72(4), 429-448.

Cuello, H. (2018, July 7). Las buenas políticas públicas no se diseñan desde el sillón. *Agenda Pública/El País*. https://agendapublica.elpais.com/noticia/14810/buenas-politicas-publicas-no-sedisenan-desde-sillon.

Garde Roca, J. A. (2004). La evaluación de políticas y su institucionalización en España. *Gestión y Análisis de Políticas Públicas*, 30–31, pp. 11–28.

Garde Roca, J. A. (2006). La institucionalización de la evaluación de las políticas públicas en España. Auditoría Pública, 39, pp. 17–26.

Garde Roca, J. A. (2023). La experiencia AEVAL en España (2005-2017). *Gestión y Análisis de Políticas Públicas*,32(julio), 96-115, https://doi.org/10.24965/gapp.11000.

Guich Mascort, A. B. (2019). Naturaleza jurídica del Instituto de España y las Reales Academias. Revista Española de Control Externo, XXI(61), pp. 103–121.

Gluckman, P. (2018). The role of evidence and expertise in policy-making: the politics and practice of science advice. *Journal & Proceedings of the Royal Society of New South Wales*, 151(1), pp. 91-101, http://dx.doi.org/10.5962/p.361824.

Gobierno de España. (2021). *Plan de Recuperación, Transformación y Resiliencia. In Plan de Recuperación, Transformación y Resiliencia*. Gobierno de España, Madrid. https://www.lamoncloa.gob.es/temas/fondos-recuperacion/Documents/160621-Plan_Recuperacion_Transformacion_Resiliencia.pdf.

Guston, D. H. (2000). *Between Politics and Science: Assuring the Integrity and Productivity of Research*. Cambridge University Press, Cambridge, https://doi.org/10.1017/CBO9780511571480.

Halligan, J. (1995). Policy Advice and the Public Service. In B. G. Peters & D. J. Savoie (Eds.), *Governance in a Changing Environment*, pp. 138–172. Canadian Centre for Management Development/McGill-Queen's University Press, Montreal, https://www.jstor.org/stable/j.ctt8139b.

Hennen, L., and Nierling, L. (2015). Taking Stock of TA in Europe and Abroad. Introduction to the Thematic Focus. *Technikfolgenabschätzung - Theorie und Pra*xis, 24(1), pp. 4-10.

Hernández Armenteros and Pérez García (Dir.) (2021) *La Universidad Española en Cifras 2019-2020*. CRUE Universidades Españolas, Madrid. https://www.crue.org/wp-content/uploads/2023/04/CRUE_UEC_22_1-PAG.pdf.

IEPP (Instituto para la Evaluación de Políticas Públicas). (2021). *Estudio de diagnóstico de la evaluación en la administración general del estado*. Ministerio de Hacienda y Función Pública, Madrid.

IEPP (Institute for Public Policy Evaluation). (2023). *Evaluación de Políticas Públicas 2022*. Informes de Evaluación. https://funcionpublica.hacienda.gob.es/evaluacion-politicas-publicas/Informes-de-Evaluacion.html.

Jasanoff, S. (2005). *Designs on Nature. Science and Democracy in Europe and the United States*. Princeton University Press, Princeton, NJ, http://www.jstor.org/stable/j.ctt7spkz.

Jurado, E. (2022). #CienciaenelParlamento: de las motivaciones iniciales a los retos futuros del asesoramiento científico legislativo en España. In García Moriyón et al. (Eds) *Hay que hacer algo*, pp. 117-138, Ediciones de la Torre, Madrid. Available in: https://cienciaenelparlamento.org/wp-content/uploads/2022/10/CienciaenelParlamento.pdf.

Kenny, C.; Washbourne, C.L.; Tyler, C. and Blackstock, J.J. (2015) Legislative science advice in Europe: the case for international comparative research, *Palgrave Communications*, 3:17030, http://dx.doi.org/10.1057/palcomms.2017.30.

Krick, E. (2022) Citizen Experts in Participatory Governance: Democratic and Epistemic Assets of Service User Involvement, Local Knowledge and Citizen Science, *Current Sociology*, 70(7), pp. 994-1012, https://doi.org/10.1177/00113921211059225.

López Facal, J. and Represa Sánchez, D. (1998) Los Organismos Públicos de Investigación (OPIS), *Arbor, CLX*, 629, pp. 1-33, https://doi.org/10.3989/arbor.1998.i629.1751.

McDonald, L. (2014). Think Tanks and the Media: How the Conservative Movement Gained Entry Into the Education Policy Arena. *Educational Policy*, 28(6), pp. 845–880. https://doi.org/10.1177/0895904813492372.

Melchor, L. (2021). Situando la ciencia y la innovación en el corazón del gobierno: las Unidades Ministeriales de Asesoramiento Científico e Innovación. Fundación Cotec, Madrid, https://online.flippingbook.com/view/932812867/.

Melchor, L. (2023). Descripción y análisis del ecosistema de ciencia para la política en España durante la COVID-19. *Gestión y Análisis de Políticas Públicas*, 32(julio), pp. 7–27, https://doi.org/10.24965/gapp.10991.

Miller, C. A. (2008). Civic Epistemologies: Constituting Knowledge and Order in Political Communities. *Sociology Compass*, https://doi.org/10.1111/j.1751-9020.2008.00175.x.

Miller, L. (2021). Economía del comportamiento, políticas conductuales y nudges. *Gestión y Análisis de Políticas Públicas*, 25, pp. 46–57, https://doi.org/10.24965/gapp.i25.10866.

Miller, L., and Rodríguez Marín, I. (2023). Estrategias experimentales para el análisis y evaluación de políticas públicas. *Gestión y Análisis de Políticas Públicas*, 31, pp. 56–70. https://doi.org/10.24965/gapp.11133.

Ministerio de Ciencia e Innovación – MCIN (2022) *Plan de Transferencia y Colaboración: La ciencia y la innovación al servicio de la sociedad*, Ministerio de Ciencia e Innovación, Madrid. https://www.lamoncloa.gob.es/consejodeministros/resumenes/Documents/2022/201222_Plan_Transferencia_Colaboracion.pdf.

Molas-Gallart, J.; Castro-Martínez, E., and Fernández de Lucio, I.; (2008) '*Interface Structures': knowledge transfer practice in changing environment*. INGENIO Working Paper Series Nº2008/4.

https://www.ingenio.upv.es/en/investigacion/working-papers/interface-structures-knowledge-transfer-practice-changing-environments.

OECD (2015), *Scientific Advice for Policy Making: The Role and Responsibility of Expert Bodies and Individual Scientists*, OECD Science, Technology and Industry Policy Papers, No. 21, OECD Publishing, Paris. http://dx.doi.org/10.1787/5js33l1jcpwb-en.

OECD. (2017). *Policy Advisory Systems: Supporting Good Governance and Sound Public Decision Making*. OECD, Paris, https://search.oecd.org/publications/policy-advisory-systems-9789264283664-en.htm.

Parkhurst J (2017) The Politics of Evidence: From Evidence-Based Policy to the Good Governance of Evidence. Routledge, Abingdon.

Pau Pedrón, A. (2009). *Las Reales Academias en el sistema jurídico español*. Colegio de Registradores de la Propiedad y Mercantiles de España.

Pavone, V.; Molas, J.; Brandts, J. and Serrano, R. (coords.) (2023) *Ciencia para las políticas públicas. Informe de Transferencia de Conocimiento*. Collection Science 4 Policy, Consejo Superior de Investigaciones Científicas, Madrid, https://digital.csic.es/bitstream/10261/329667/4/01_S4P_CIENCIA_PARA_POLITICAS_DIGITAL.pdf.

Pautz, H. (2011). Revisiting the think-tank phenomenon. *Public Policy and Administration*, 26(4), pp. 419–435. https://doi.org/10.1177/0952076710378328.

Pautz, H. (2020). Think Tanks and Policymaking. *Oxford Research Encyclopedia of Politics*, April 2020, pp. 1–19. https://doi.org/10.1093/acrefore/9780190228637.013.1420.

Pelz, D. C. (1978). Some Expanded Perspectives on Use of Social Science in Public Policy. En J. M. Yinger, J.M. y Cutler, S.J. (Eds.), *Major Social Isssues: A Multidisciplinary View* (pp 346–357). The Free Press, New York City.

Pielke, R. A. (2007). *The Honest Broker: Making Sense of Science in Policy and Politics*. Cambridge University Press, Cambridge, https://doi.org/10.1017/CBO9780511818110.

Real-Dato, J. (2005). Actores, ideas e instituciones en las políticas públicas. In M. Pérez Sánchez (Ed.), *Análisis de políticas públicas*, pp. 77–107. Universidad de Granada, Granada.

Rich, R. F. (1991). Knowledge Creation, Diffusion, and Utilization: Perspectives of the Founding Editor of Knowledge. *Knowledge*, 12(3), pp. 319–337, https://doi.org/10.1177/107554709101200308.

Santillán-García, A., Oliver, E., Grigorian, L., Climent, A. M., and Melchor, L. (2021). #CienciaenelParlamento: la necesidad de una oficina parlamentaria de asesoramiento científico y tecnológico. *Gaceta Sanitaria*, 35(3), pp. 293-297, https://doi.org/10.1016/j.gaceta.2019.08.004.

Stone, D. (1996). Capturing the Political Imagination: Think Tanks and the Policy Process. Frank Cass, London.

Varela Merino, B. (2023). Dirección y evaluación de políticas públicas en base a la evidencia: ¿dónde se encuentra la Administración General del Estado? *Gestión y Análisis de Políticas Públicas*, 32, pp. 28–44. https://doi.org/10.24965/gapp.11013.

Viñas, V. (2009). The European Union's drive towards public policy evaluation: The case of Spain. *Evaluation*, 15(4), pp. 459–472, https://doi.org/10.1177/1356389009341900.

Weiss, C. H. (Ed.). (1977). *Using Social Research in Public Policy Making*. Lexington, Mass.: Lexington Books, D.C. Heath and Company.

Ziman, J. (2000). *Real Science. What it is, and what it means*. Cambridge University Press, Cambridge.

List of abbreviations and definitions

AAPP	Public administrations
AEVAL	Agency for the Evaluation of Public Policies and Quality of Services
AIReF	Independent Authority for Fiscal Responsibility
ALINNE	Energy Research and Innovation Alliance
BOE	Official State Gazette
CCOO	Labour committees
CdEco	Cercle d'Economia
CdEmp	Círculo de Empresarios de Madrid
CEE	European Economic Community
CeeP	Science in Parliament
CEOE	Spanish Confederation of Business Organisations
CIEMAT	Centre for Energy, Environmental and Technological Research
CONESPOL-PUB	Project and research 'Impact of expert knowledge on the design and adoption of public policy in Spain' (PGC2018-098319-B-C21, funded by the Ministry of Science and Innovation/State Research Agency.
COSCE	Spanish Confederation of Scientific Societies
CSIC	Higher Council for Scientific Research
CTI	Science, technology and innovation
EPTA	European Parliamentary Technology Assessment
ESM	European Stability Mechanism
EU	European Union
FAES	Foundation for Analysis and Social Studies
FECYT	Spanish Foundation for Science and Technology
FEDEA	Foundation for Applied Economic Studies
GAS	General Administration of the State
IAC	Canary Islands Institute of Astrophysics
IEE	Institute of Economic Studies
IEO	Spanish Institute of Oceanography.
IEPP	Institute for the Evaluation of Public Policy
IGME	Geological and Mining Institute of Spain
INE	National Institute of Statistics
INIA	National Institute for Agricultural and Food Research and Technology
INTA	The National Institute of Aerospace Technology
ISCIII	Carlos III Health Institute
ISGlobal	Barcelona Institute for Global Health
JRC	Joint Research Centre
LCTI	Law on Science, Technology and Innovation
OLUS	Organic Law of the University System

MAETD	Ministry of Economic Affairs and Digital Transformation
MAEUEC	Ministry of Foreign Affairs, European Union and Cooperation (MAEUEC);
MAPA	Ministry of Agriculture, Fisheries and Food;
MCINN	Ministry of Science and Innovation
MCON	Ministry of Consumer Affairs
MCULD	Ministry of Culture and Sport
MDEF	Ministry of Defence
MDSAG	Ministry of Social Rights and 2030 Agenda
MEFP	Ministry of Education and Vocational Training
MHFP	Ministry of Finance and Civil Service
MICT	Ministry of Industry, Trade and Tourism
MIGU	Ministry of Equality
MINT	Ministry of the Interior
MISSM	Ministry of Inclusion, Social Security and Migration
MJUS	Ministry of Justice
MPRES	Ministry of the Presidency
MPT	Ministry of Territorial Policy
MSAN	Ministry of Health
MTERD	Ministry for Ecological Transition and Demographic Challenge
MTES	Ministry of Labour and Social Economy
MTMAU	Ministry of Transport, Mobility and Urban Agenda
MUNIV	Ministry of Universities
BCAFs	Advisory and consultative bodies
OPIs	Public Research Agencies
OTRI	Office for the Transfer of Research Results
PANCRAS-MAX	Policy Analytic capacities in regional public administration in Spain: mapping, assessing, and explaining
PRESGOB	Office of the Prime Minister
RTRP	Recovery, Transformation and Resilience Plan
PTI	Interdisciplinary Thematic Platforms
R&D	Research and Development
R&D&I	Research, Development and Innovation
RCT	Randomised controlled trials
SAM	Scientific Advice Mechanism of the European Commission
UGT	General Union of Workers

List of boxes

List of graphics and figures

List of tables

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en).

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union. You can contact this service:
— by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
— at the following standard number: +32 22999696,
— via the following form: european-union.europa.eu/contact-eu/write-us_en.

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (european-union.europa.eu).

EU publications

You can view or order EU publications at op.europa.eu/en/publications. Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (european-union.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

Open data from the EU

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

Science for policy

The Joint Research Centre (JRC) provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society

EU Science Hub
joint-research-centre.ec.europa.eu

Publications Office
of the European Union