

INDEPENDENT ADVICE IN RESEARCH AND INNOVATION POLICY: THE ROLE OF THE SPANISH SCIENCE, TECHNOLOGY AND INNOVATION ADVISORY COUNCIL (CACTI)

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ABSTRACT

This article analyses the trajectory of the Spanish Science, Technology and Innovation Advisory Council (CACTI) as a central component of the national science, technology and innovation policy system. It examines how institutional design shapes the integration of expertise into policymaking within a continental administrative tradition marked by strong bureaucratic dominance and limited policy evaluation practices.

Between 1986 and 2011, the Advisory Council operated as a hybrid body integrating external stakeholders, experts and senior public officials, which facilitated proximity to decision-making but did not generate a strong evaluation culture. The 2011 reform transformed it into an autonomous and formally independent body composed exclusively of external members. While this change aligned with prevailing European practices of independent advice, it weakened institutional embeddedness and reduced its effective influence on policy design.

The Spanish case illustrates a broader governance dilemma: independence alone does not guarantee advisory impact. In administrative systems where bureaucrats play a central advisory role, effectiveness depends on sustained institutional linkages, political demand and integration into the policy cycle. Persistent weaknesses in policy evaluation, fragmented multilevel coordination and rhetorical Europeanisation without institutional consolidation further constrain advisory capacity.

The article concludes that strengthening policy advisory systems requires not merely autonomy but effective articulation between expertise, bureaucracy and political decision-making. The Spanish experience offers comparative lessons for countries adapting international advisory models to domestic administrative traditions.

Keywords: *Policy for Science, Scientific Advice, Research Evaluation, Policy Advisory Bodies, Cacti, Science and Innovation Policies, Spain.*

1. INTRODUCTION

This paper examines the role and evolution of the Science, Technology and Innovation Advisory Council (CACTI) within the Spanish research and innovation policy system. It analyses how this body operates in the design and evaluation of science, technology and innovation (STI) policy.

Referring to the classical divide between science and policy (Brooks, 1964), the analysis focuses on “policy for science” within the STI policy cycle. The governance of science, innovation and their associated public policies in Spain has been shaped primarily by two legislative milestones: the 1986 Science and Technology Act and the 2011 Science and Innovation Act (partially amended in 2022). Although several minor reforms have been introduced over the years, these two Acts constitute the foundational framework of the national science, technology and innovation system and the regulations governing its operation.

Although Spain is often described as an almost federal country (Sala, 2014; Colino, 2020), this analysis focuses on the national level of STI policymaking and, specifically, on the role and changing operation of the Science, Technology and Innovation Advisory Council (CACTI)¹ as the institutionalised advisory and participatory body in the Spanish science, technology and innovation policy arena. Currently the Advisory Council is supported by the administrative structure of the Ministry of Science,

1 The Science, Technology and Innovation Advisory Council (CACTI) is the current name of the advisory body. Since its formal inception in 1986, the council has changed its name, mission, structure and composition. For ease of reference, we use Advisory Council or CACTI.

Innovation and Universities, but legally reporting to the Scientific, Technological and Innovation Policy Council (CPCTI).

Originally established under the 1986 Science and Technology Act (Ley 13/1986, art. 9) as the Science and Technology Advisory Council (CA-CyT), the Advisory Council was legally assigned several advisory functions to the government, as well as responsibilities for defining objectives and STI instruments, promoting policy evaluation and fostering the participation of research and innovation actors in policymaking. These functions have remained largely unchanged, but the composition of the Advisory Council and its degree of embeddedness in the STI policy process have evolved over time. Under the 2011 Science, Technology and Innovation Act (Ley 14/2011, art. 9), the Advisory Council was renamed CACTI.

Although the Advisory Council has enjoyed a long institutional existence -it will celebrate its 40th anniversary in 2026-, its contributions, visibility and effectiveness, both past and present, have been far from optimal. The aim of this paper is not merely to describe the structure and functions of the Advisory Council, but rather to offer a self-critical reflection on the role it has recently played, and could potentially play, in the development of Spanish STI policy.

Good policymaking depends, among other factors, on an adequate supply of knowledge, information and expertise. Policy legitimization and social acceptance among key actors are also crucial for the successful design and implementation of STI policies. Accordingly, the effectiveness of public policy and the quality of STI governance are assumed to depend on the strength of the policy advisory system in place (Capano et al., 2025). A policy advisory system is understood here as “formal or informal advisory units and practices, inside and outside government, that exist at a given time and with which governments and other actors engage for policy-making purposes” (Craft & Halligan, 2020).

While a robust advisory system is essential for high-quality policymaking, there is no single formula that can be applied uniformly across countries and policy domains. Each country and policy sector has developed its

own traditions and understandings regarding the organisation of advice, the provision of expert knowledge and the participation of actors in the policy process.

2. CHARACTERISING THE POLICY ADVISORY SYSTEM

Over recent decades, the literature on science advice (Smith, 1992; Golden, 1993) and policy advice for science (Halligan, 1995, 1998) has followed different trajectories and reference points. However, both traditions share a common feature: the dominance of Anglo-Saxon scholarship, which has shaped debates while often downplaying the extent to which country-specific features of policymaking processes and public bureaucracies condition the operation and outcomes of policy advisory systems.

The Spanish model of government and public administration is closer to continental “Napoleonic” administrative systems. In such contexts, the main source of policy (and political) advice typically lies within the bureaucracy itself, notably among senior officials directly involved in the policymaking process (Brans et al., 2025; Shafran, 2022) or minister cabinet members.

Scientific expertise is central to some processes of resource allocation in STI policy, but science or research evaluation follows its own specific procedures (Sanz-Menéndez, 1995), and its primary purpose is not the design of policy but the management of policy instruments and the allocation of resources for science.

The focus here is on advice to STI policymaking at any stage of the policy cycle—from design to evaluation—but in institutionalised forms. Early contributions to the analysis of the policy advisory systems examined where policy advisers are located, how close they are to decision-makers, and how different systems of policy advice are organised (Plowden, 1987; Halligan, 1995). Subsequent research has broadened this perspective to include the situational and socio-political contexts in which policy advice is produced, to consider specificities of policy domains and to incorporate a comparative dimension (Craft & Wilder, 2017).

From this literature on policy advice (Capano et al., 2025), several insights emerge that are relevant to STI policy:

- First issue is the location of advice, and the extent to which it is “internal” or “external” to government. In other words, to what degree are advisory functions and institutionalised bodies integrated into decision-making processes? Should advisers and advisory bodies be situated within policymaking structures, or should they operate as externally located actors?
- Second issue is the membership and composition of institutionalised advisory bodies. Who occupies these roles: senior officials, independent experts from outside the public administration, or representatives of organised interest groups (for example, trade unions or business associations)?
- Third, and related to the previous issues, is whether advisory bodies should have a relatively homogeneous composition or a “mixed” or “hybrid” one, bringing together decision-makers, bureaucrats and external experts.

Institutionalised policy advice usually pursues multiple missions, but two are particularly important: a) defining policy objectives, choices and designs, and b) evaluating policies and instruments as part of the policy cycle and learning processes. Both advisory functions –setting policy objectives and supporting policy evaluation– were formally included, as will be shown, in the mandate of the Spanish Advisory Council.

In the Anglo-Saxon tradition, there is a strong emphasis on “independent advice” provided by external experts to governments (Craft & Howlett, 2025). By contrast, in Spain and in several continental European countries, particularly those with corporatist traditions, the prevailing model has stressed the participation of actors in the policy process and the role of bureaucracies as knowledge and advice providers to policymaking. In Spain, the level of “independence” from government of the institutionalised advisory body, once appointed, was relatively low. However, the presence of policymakers and senior officials responsible for

STI policy within the Advisory Council, alongside experts and organised interests, ensured a stronger degree of integration of deliberation into policymaking processes.

In this view, our hypothesis is that recent reforms have tended to weaken traditional patterns of interaction between advisory bodies and the bureaucracies responsible for designing and implementing policies. Bureaucracies in the past have seen the Advisory Council member's as actors directly involved in the policy making. Where institutional design does not provide direct links between external advisers and political or administrative decision-makers, additional operational problems are likely to arise. The administrative location of an independent advisory body -its position within the governmental structure- and the way it connects with officials responsible for designing, implementing and evaluating public policies are therefore crucial determinants of its effective operation. These are the issues explored in the remainder of the paper.

3. THE EUROPEANISATION OF SCIENCE, TECHNOLOGY AND INNOVATION POLICY IN SPAIN

In a quasi-federal country, the National and Regional Governments have their own STI policies and the institutionalised multilevel coordination mechanism is the STI Policy Council, that includes representatives from all Governments. The governance of the Spanish STI system is structured around the Spanish STI Strategy (EECTI) and the State STI Plan (PECTI), which, according to the legal framework, are the main instruments through which Spain defines objectives, programmes and tools in the fields of science, technology and innovation. However, neither the strategy nor the plans are supported by binding budgets and, at best, contain only indicative spending references. In recent years, the EECTI and the PECTI have increasingly aligned with –or, in some cases, directly replicated– the EU Framework Programme for R&D; the current period is framed as a seven-year strategy (2021–2027), divided into two State Plans and periods: 2021–2023 and 2024–2027.

Spain's science, technology and innovation policies have undergone a sustained process of Europeanisation since 1986, when Spain joined the European Communities (Sanz Menéndez, 1997), characterised by the progressive alignment of national discourses, strategic frameworks and policy narratives with those promoted by the European Union (EU) (Cruz-Castro & Sanz-Menéndez, 2022). This alignment has facilitated Spain's integration into EU research agendas and reinforced the legitimacy of science and innovation policies as a lever for socio-economic development (Lundvall & Borrás, 2005). Yet, as in other member states with less mature innovation systems, discursive convergence has not consistently translated into robust domestic institutional learning or adaptation (Kuhlmann & Rip, 2018), and the Spanish case illustrates a persistent tension between rhetorical Europeanisation and the limited transformation of underlying governance structures (Cruz-Castro & Sanz-Menéndez, 2021).

Despite improvements in aggregate scientific output and international collaboration, Spain continues to display structural weaknesses in its STI system, including limited degrees of high-quality research (Rodríguez-Navarro & Brito, 2022), governance fragmentation (Sanz-Menéndez & Cruz-Castro, 2005), instability in public funding and research positions (Cruz-Castro & Sanz-Menéndez, 2016), divisions regarding research careers models (Sanz-Menéndez & Cruz-Castro, 2019) and a persistent lack of systematic policy evaluation (Sanz-Menéndez, 1995). These limitations suggest that the simple replication of European templates is unlikely to generate the institutional resilience required for sustained performance. Others have advertised that adopting successful models from other countries does not guarantee success by the adopter (Manski, 2013). A more context-sensitive approach would instead focus on designing policy instruments tailored to Spain's structural characteristics and institutional capacities (Borrás & Jordana, 2016), leveraging national strengths –such as internationally competitive research groups and dynamic regional innovation ecosystems– while directly addressing entrenched weaknesses. The Advisory Council has frequently issued opinions along these lines, although its capacity to influence policy has remained limited.

4. CHANGES AND ADAPTATION OF THE ADVISORY COUNCIL IN SPAIN

Following Spain's transition to democracy in the late 1970s, the advisory function for science and technology policy was formally recognised and institutionalised with the enactment of the first Science and Technology Act (Ley 13/1986). This Act established a distinctive governance model for science and technology policy, ruled by an Interministerial Commission responsible for designing the main policy instrument: the National R&D Plan, conceived in parallel with the structure of the EU Framework Programmes (Sanz-Menéndez & Borrás, 2001). The Interministerial Commission for Science and Technology (CICYT) was supported by a General Secretariat for the National R&D Plan, a permanent administrative body which, although formally reporting to the Ministry of Education and Science (the Minister of Education and Science was the CICYT chair), operated with an unusually high degree of scientific and budgetary autonomy within the Spanish public administration.

The institutionalisation of science policy advisory functions in the late 1980s took place in a context marked by the constitutional endorsement of the "social market economy", which emphasised the participation of scientific, economic and social actors in policymaking. Consequently, "scientific advice"—and advice provided by scientists—for the formulation, monitoring and evaluation of R&D policies emerged closely linked to the representation of organised interests, initially those of trade unions and employers' organisations and later those of academic and other corporate actors.

The 1986 Act defined the purpose of the Advisory Council as follows:

"In order to promote the participation of the scientific community and economic and social agents in the preparation, monitoring and evaluation of the National Plan (...), an Advisory Council for Science and Technology is hereby set up, the composition of which shall be established by regulation and which shall be chaired by the Minister designated by the Government"
(Ley 13/1986, art. 9.1).

It also set out its functions:

- “a) To propose objectives for incorporation into the National Plan.
- b) To advise the Interministerial Commission in the preparation of the National Plan.
- c) To report, prior to its submission to the Government, on the National Plan drawn up by the Interministerial Commission, as well as on the degree of its fulfilment, especially with regard to its social and economic impact.
- d) To submit to the Interministerial Commission proposals for modifications to the National Plan.
- e) To issue any reports and opinions requested by the Interministerial Commission or by the bodies responsible for scientific policy in the Regional Governments“
(Ley 13/1986, art. 9.2).

The functions of the Advisory Council were therefore primarily associated with the preparation, design, monitoring and evaluation of the main policy instrument, the National R&D Plan. Its main interlocutor was the Interministerial Commission, the highest decision-making body in R&D policy at the time, although the framework also allowed for potential collaboration with regional governments that started to develop their science and innovation policies (Sanz-Menéndez & Cruz-Castro, 2005).

The organisation and composition of the Advisory Council were subsequently regulated through a Royal Decree (RD 834/1987). Reflecting the longstanding distribution of responsibilities between the Ministries of Education and Science and of Industry and Energy, the presidency of the Advisory Council was assigned to the Minister of Industry and Energy. Alongside councillors proposed by various institutions, senior officials from the main ministerial science and technology policy bodies were also included.

By design, between the mid-1980s and the late 1990s, the Advisory Council was deeply embedded in the decision-making processes and influencing the bodies responsible for defining Spanish R&D policy

(the Interministerial Commission and the General Secretariat for the National R&D Plan). Its activities focused predominantly on defining policy objectives and policy design, while policy evaluation – a practice with little tradition in Spain – remained largely underdeveloped and marginal, both as a mechanism for assessing results and impacts and as an instrument for organisational learning (Sanz-Menéndez, 1995).

By the late 1990s, the concept of “innovation” and the broader innovation policy agenda consolidated within European debates (EC, 1995; OECD, 1999), and begun to reshape Spanish R&D policy. This shift, occurring alongside a change in the governing party, prompted a restructuring of governance arrangements. Most notably, the Ministry of Science and Technology was created in April 2000, building on the historical structure of the Ministry of Industry and integrating R&D policy units that had traditionally operated with considerable autonomy and close ties to the research community. The newly established Ministry brought together policy initiatives related to R&D, innovation and digitalisation. These governmental changes were accompanied by a modification of the Advisory Council’s structure and composition through a Royal Decree (RD 413/2001).

Although the Advisory Council’s core functions remained unchanged, its composition evolved with the inclusion of *ex officio* political representatives from other ministries. This shift transformed the Advisory Council not only into a body for the participation of scientific, economic and social actors, but also into an emerging interministerial coordination forum. During this period, the advisory and participatory body was structurally and functionally integrated into science and technology decision-making, with a mixed or hybrid composition that combined representatives of scientific, economic and social sectors with high-ranking officials from ministries with responsibilities for Science, Technology and Innovation Policy (STIP).

In 2004, responsibility for STIP was again divided, although the Public Research Organisations remained under the Ministry of Education and Science, and the Council was reassigned. In 2008, responsibilities were once more concentrated under the Ministry of Science, Universities

and Innovation, which promoted a reform of the general regulatory framework for science, technology and innovation policy, submitting to Parliament the 2011 Science, Technology and Innovation Act.

Changing into an “independent” and “external” body to the policy process

The 2011 Act (Ley 14/2011) slightly redefined the nature and functions of the Advisory Council –whose acronym, CACTI, persists today– by incorporating innovation, as it had previously occurred in the National R&D and Innovation Plan.

“The Advisory Council on Science, Technology and Innovation is created as a body for the participation of the scientific and technological community and economic and social agents in matters related to science, technology and innovation”

(Ley 14/2011, art. 9.1.).

“The functions of the Advisory Council on Science, Technology and Innovation shall be as follows:

- a) To advise the Ministry of Science and Innovation in the preparation of, and reporting on, proposals for the Spanish Science and Technology Strategy and the Spanish Innovation Strategy.
- b) To advise the Ministry of Science and Innovation in the preparation of, and reporting on, proposals for the State Plan for Scientific and Technical Research and the State Plan for Innovation.
- c) To propose, on its own initiative, objectives and modifications for their incorporation into these instruments (...), and to monitor their subsequent development through annual reports.
- d) To advise the National and Regional Governments and the Scientific, Technological and Innovation Policy Council in the exercise of their functions, and to report on the matters determined by them.
- e) To promote the introduction, in the Spanish System of Science, Technology and Innovation, of rigorous evaluation mechanisms

that make it possible to measure the social effectiveness of the public resources used”
(Ley 14/2011 art. 9.2.).

The new Act brought new functions to the Advisory Council and redefined its formal adscription to the Scientific, Technological and Innovation Policy Council (CPCTI), a body including national and all regional governments that is formally responsible of the multilevel STI policy coordination.

The Act did not radically alter the participatory role of stakeholders and interest groups; rather, it clarified its scope. It removed direct evaluative responsibilities regarding STIP from the Advisory Council’s remit, while assigning it a more general role in promoting mechanisms to evaluate and measure the social impact of public expenditure. At the same time, its composition was revised, transforming the Advisory Council into an “independent” body capable of electing its own president and operating according to “the principles of quality, independence and transparency” (Ley 14/2011 art. 9.4), excluding representatives of public administrations and requiring it to develop its own working dynamics, including the adoption of internal rules of procedure.

Nonetheless, the appointment of members (with the exception of representatives of trade unions, employers’ organisations and Rectors association) remained a discretionary prerogative of ministerial authorities, who formally forward nominations to the Policy Council for approval. The Royal Decree (RD 1024/2015) governing the Council’s composition and operating procedures –previously endorsed by the Advisory Council in 2013– was finally issued four years later, under a different government, political party and Ministry (at the time the Ministry of Economic Affairs), after an economic crisis that had diverted attention from STI policy. In 2023, a new internal agreement of the Advisory Council modified this Royal Decree and it was partially amended (RD 1014/2023), further reinforcing the Council’s autonomy and capacity for self-organisation; the decree also introduced formal procedures for selecting independent councillors through an open call for expressions of interest managed by the responsible Ministry.

Internal functioning and operation of the Advisory Council in recent years

Since 2011, the new legal framework has granted CACTI formal independence and autonomy from the government and policymakers: it sets its own agenda, determines its internal organisation and decides on meeting schedules and working methods. Additionally, the Advisory Council could legally be commissioned to conduct analyses, issue opinions and produce policy briefs. Despite the fact that CACTI could in principle work for the Policy Council, the Advisory Council has not been requested to undertake any specific task during these years.

In terms of its relationship with policymakers, the Ministry provides administrative support for the drafting of minutes but no resources for substantive support activities, such as the preparation or commissioning reports or analyses. The Advisory Council meets, on average, every two months and policymakers and officials are invited to present their areas of responsibility to the Advisory Council, and interaction tends to occur through informal exchanges. The Advisory Council continues to perform only one mandatory role established by law: issuing a (non-binding) opinion on the government's proposal for each new State Research, Technology and Innovation Plan prior to its approval.

During the last eight years, there has not been a single occasion on which it has been necessary to resort to a formal vote on any issue; the usual working method is consensus. One explanation for this mode of operation is that draft reports are thoroughly debated among members and it is taken for granted that, in such a diverse group, differing views will exist and should be accommodated. In other words, reports may contain non-coinciding opinions or ambiguity regarding some issues; seeking full consensus would likely result in documents reduced to minimal common denominators.

In 2025, CACTI has twenty-two members, reflecting steady growth over the years. Five are nominated by stakeholder groups, while the remaining members are appointed by the Policy Council, following a ministerial proposal after a selection, based on a public expression of interests from the candidates.

The Advisory Council has at times operated through working groups. For example, in 2024 three groups were established to address topics considered to be of high priority: evaluation of the science system and research careers, knowledge transfer, and dual-use technologies and technological sovereignty. The Advisory Council worked on these topics and issued analysis and recommendations, but no mechanism exist for monitoring implementation. The Council also uses a basic but important tool: inviting key actors from the science, technology and innovation system to participate in its meetings in order to clarify crucial aspects of the issues under discussion. These invitees range from senior government officials to professionals from the private sector.

From a self-critical perspective, it must be acknowledged that the Advisory Council is barely known within the STI system. Whether this is due to its internal working methods or to a lack of resources is open to debate, but the fact remains that the substantial work being carried out is not being fully capitalised upon. From the authors' point of view, it is particularly important to stress that coordination with the Scientific, Technological and Innovation Policy Council, the body to which the Advisory Council formally reports, has been practically non-existent. To the best of our knowledge, the Advisory Council has never been asked for advice by regional governments, which represents a missed opportunity to improve coordination and exchange of practices and policy learning in a multilevel STI system. This detach may partly reflect the shift from including senior officials among the members to excluding them altogether; since the Advisory Council became an "independent body", it appears to occupy a position in the policy chain that has not been effectively activated.

In the context of an autonomous and independent body with a self-elected chair, several potential drivers may enhance or hinder the Advisory Council's efficiency and political impact:

- a) The organisational linkage to the highest political authority can favour visibility and potential influence. For many years there has been no direct institutional link or administrative dependence on the Minister's cabinet; the formal link of the Advisory Council

in the Ministry has recently changed (from Technical General Secretariat of the Ministry to the Directorate-General responsible for STI policymaking). This change potentially increases the direct influence of the Advisory Council in the STI policy making, because of a more direct connection with the managers and policymakers responsible of the STIP that directly depend on the State Secretary (Junior Minister). Reducing this potential influence are bureaucratic dynamics within the Ministry that tend to resist “uncontrolled” high-level access that might compete with internal advisory roles. Nevertheless, even without a direct link to the Minister’s cabinet, it should be noted that, until two years ago, the Minister was present at almost all Advisory Council meetings.

- b) The Advisory Council President’s reputation and ability to access high-level political actors in the STI system, together with his or her willingness -and that of Council members- to devote time and personal effort to an unpaid task, are also crucial. As the Council lacks its own resources and its activities rely on members’ efforts, the commitment to invest in its work depends heavily on their interests and incentives. This driver is, in turn, conditioned by the degree of politicisation of the advisory system; for instance, if the Council Chair (whose four-year mandate may be renewed once) was elected under a previous minister, political access may be weakened. Under these constraints, and in the absence of ministerial resources, the entrepreneurial capacity and leadership of the Advisory Council Chair can play a key role in promoting efficient and impactful behaviour.
- c) The explicit demand by policymakers for reports and advice in the course of STI policymaking is another central factor. Without a clear demand for advice, the willingness of Council members to work is likely to diminish rapidly. Such external demand inevitably competes with internal advisory capacities -spaces that bureaucrats typically seek to protect- but may nonetheless emerge if internal actors perceive that engaging the Council will provide allies, resources and additional legitimacy in the design of STI policy. Furthermore,

growing external and formal requirements for evaluating policy results may also increase demand for the Advisory Council's input.

5. A CHANGING ECOSYSTEM FOR POLICY ADVICE

The policy advisory system is also facing environmental pressures from changes in the broader context of public administration and the relation between science and policy. The two most significant changes emerge from European influences on the government, revitalised in the context of the EU Recovery and Resilience Plan² and the commitments established by the Spanish government.

The first is the promotion of a new general policy evaluation system, which led to the approval of the Act on institutionalising the evaluation of public policies in the national government administration (Ley 27/2022). Despite the increasing prominence of evaluation and evidence-based policy in government rhetoric, and the formal creation of the Spanish Agency for the Evaluation of Public Policies (AEEPP), their statutes have been approved only recently (RD 65/2026).

The Spanish Agency for the Evaluation of Public Policies may represent an important step towards addressing one of Spain's most persistent deficiencies: the absence of independent, rigorous and systematic evaluation of public interventions. If effectively implemented, the new Agency could provide the analytical infrastructure necessary for evidence-informed policymaking, supporting learning processes across government and, specifically, strengthening STI policy design. However, its potential impact remains uncertain and will depend on its operational autonomy, the methodological robustness of its evaluations, and the willingness of political and administrative actors to integrate evaluative evidence into decision-making processes (OECD, 2020).

As noted earlier, Spain has no strong tradition of evaluating R&D and innovation policies, although some previous exercises can be mentioned

2 https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/country-pages/spains-recovery-and-resilience-plan_en#whats-in-the-plan

over the years, almost always driven by external pressures (OECD 2007; ERAC 2014; OECD 2021). In general, these efforts have been sporadic, lacking continuity or direct effects beyond mentions in plans. Indeed, one of the criticisms in the Preliminary Report on the State Plan for STI (2024–2027), issued by CACTI in January 2024, was the absence of any evaluation of previous and current plans to enable learning, reorientation and rethinking.

The second government initiative to enhance the role of science in public policies (Cañibano & Real-Dato, 2024) – aligned with the European initiatives such as science for policy (S4P) – is the creation of a system of scientific advisers in ministries (including a scientific advisor at every minister’s cabinet) and a coordinating department at the Prime Minister’s office (the National Office for Scientific Advice – ONAC).³ Even if ONAC appears to be a “competitor” to the Advisory Council, its initial effect has been to increase demand for advice and stakeholder participation in the science, technology and innovation policymaking process.

In conclusion, the expansion of evaluation activities within the national government and the growing opportunities for scientific advice to improve policy quality may foster a more favourable ecosystem that could boost demand for the Advisory Council’s work in the next round of designing Spanish STI policy.

6. CONCLUSIONS AND BALANCE

This article has analysed the trajectory of the Spanish Science, Technology and Innovation Advisory Council (CACTI) as a key component of the national STI policy system, examining how institutional design conditions the integration of expertise and knowledge into policymaking. The Spanish case illustrates how advisory arrangements are embedded in administrative traditions, corporatist practices and Europeanisation dynamics, and how reforms inspired by external models may produce unintended effects when insufficiently adapted to domestic realities. Several conclusions emerge.

3 <https://www.onac.gob.es/Paginas/index.aspx>

First, institutional design shapes influence. Between 1986 and 2011, the Advisory Council operated as a hybrid body combining representatives of scientific, economic and social interests with senior officials directly involved in STI policy. This mixed structure ensured proximity to decision-making and facilitated interaction with those drafting and implementing the National R&D Plan. Although its evaluative role remained limited, the Advisory Council was embedded in the policy cycle and institutionally connected to core STI policymaking arenas.

The 2011 transformation of the Advisory Council into an autonomous and independent body composed exclusively of external members -with enhanced self-organisation and the capacity to elect its own president- marked a decisive departure from this model. This reform appears to have reduced the effectiveness of advisory input in the policy design process. In the Spanish administrative context, independence has translated less into greater influence than into weaker institutional embeddedness and diminished access to decision-making arenas.

Second, independence without integration risks marginalisation. Effectiveness depends not only on autonomy but also on institutional positioning and access to politicians, policymakers and bureaucrats. In systems where bureaucrats are central providers of policy advice, excluding senior officials from advisory bodies may weaken key linkages. CACTI's current configuration has reduced systematic coordination with ministerial officials and communication with the system coordination institution, the Scientific, Technological and Innovation Policy Council (CPCTI), to which it formally reports.

This is particularly problematic in a decentralised polity such as Spain. Limited interaction with regional governments represents a missed opportunity to provide integrated multilevel advice and support exchanges and policy learning in a multilevel system.

To the best of our knowledge, the Advisory Council has never been formally requested to advise regional governments, representing a missed opportunity to benefit from the federal nature of the Spanish STI system. This detach illustrates how institutional redesign unintentionally

weakened multilevel advisory linkages between advisory input and multilevel policymaking.

Third, evaluation remains the structural weakness of Spanish STI governance. Despite recent legislative initiatives, STI policy continues to be designed with limited systematic assessment of previous outcomes. After 2011, CACTI no longer holds direct evaluative responsibilities, and its capacity to contribute to learning processes has been constrained. Without robust evaluation, policy cycles risk becoming rhetorical exercises aligned with European templates rather than grounded in domestic performance evidence. Persistent structural issues such as funding instability in the past, fragmented governance, precarious research careers, limited excellence in research and private R&D expenditure, require clearer prioritisation supported by reliable evaluative information and careful examination of previous policies and instruments.

Fourth, advisory effectiveness depends on political demand. Advisory bodies do not operate in isolation. Their impact depends on explicit demand from policymakers. In recent years, CACTI has mainly fulfilled its mandatory function of issuing a non-binding report on the State STI Plan, but it has rarely been formally commissioned to undertake broader strategic tasks. Combined with limited resources, this weak demand reinforces its peripheral role.

The advisory ecosystem, however, is evolving. New evaluation structures and scientific advisory mechanisms within ministries signal growing rhetorical commitment to evidence-informed policymaking. These developments may create opportunities for CACTI, provided that institutional linkages are clarified and its outputs are integrated into routine decision-making processes.

Fifth, Europeanisation has generated discursive convergence without full institutional consolidation. Spanish STI policy increasingly mirrors European frameworks in language and planning cycles, yet domestic governance capacities have not strengthened proportionally. The trajectory of CACTI reflects this pattern: adoption of independent advice as a norm has not been matched by stable evaluation practices, effective

coordination or multilevel integration. A gap persists between rhetorical modernisation and institutional consolidation.

Strengthening CACTI does not require reversing its independence, but reinforcing its institutional connections, particularly with the STI Policy Council, ministerial cabinets and regional authorities. Clearer procedural channels for requesting advice, improved access to evaluative data and greater visibility within the STI community would enhance both legitimacy and impact.

The Spanish case highlights a broader comparative lesson: reforms inspired by international models must be adapted to national administrative traditions. Independence and transparency are necessary but not sufficient. Without integration, coordination and political activation, advisory bodies risk becoming peripheral.

These governance shortcomings are particularly problematic in light of persistent misdiagnoses of Spain and Europe's STI challenges. The widespread adoption of the "European paradox" narrative has contributed to an overemphasis on innovation deficits while obscuring deeper structural problems. In the Spanish case, the priority lies less in correcting innovation performance per se than in strengthening the quality, stability and institutional foundations of scientific research. Sustained investment, predictable career trajectories and supportive organisational environments are prerequisites for innovation outcomes. In addition, the limited involvement of the private sector in R&D remains a major unresolved weakness that advisory mechanisms have so far failed to address effectively.

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