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Institutional Framework for the Science–Policy Interaction

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Key takeaways:

- With many issues hotly contested, ‘boundary organisations’ sitting at the intersection of the knowledge and policy spheres are more important than ever and should be fully integrated into policymaking structures. They may take a form of the embedded or affiliated institution or platform.
- Along with producing new knowledge themselves, these boundary organisations must act as lighthouses, helping policymakers to navigate their way through today’s vast sea – or even ocean – of knowledge. To solve ‘wicked’ challenges, these boundary organisations must bridge the gap between scientific disciplines and policy fields.
- A new type of ‘scientists for policy’ with a capacity to understand and value the challenges of the policymaking should be nurtured. Constant interaction and cooperation between science and policy should be the main working method.
- The trust between scientists and policymakers is the most important ingredient allowing science to be fully used in policy cycle.
- To produce solutions that have traction in the real world, all relevant perspectives, including values and perceptions, must be taken into account. In the digital age, people will no longer tolerate being excluded from the debate.



Most of the chapters of this handbook advise on the practices of individual scientists and policymakers. By contrast, this chapter tackles institutional issues. It has been included because it is impossible to separate the practices of individual scientists and policymakers from the institutional setting in which they are working. This chapter is inspired by the reform of the Joint Research Centre (JRC), initiated in 2016. The JRC employed more than 2000 scientists and is a department (or Directorate General) of the European Commission. This was the first comprehensive reform of the organisation for many years. It was designed to place the JRC ahead of the curve – to put it in a stronger position to tackle the challenges of the coming decades. Although it is still in the early stages of its implementation, lessons can already be learnt. Equally, while the JRC is unique, many of these lessons are more generally applicable. That is why we think the chapter will be of interest to people in leadership or management positions who are able to shape or influence institutional structures. However, it should also be of more general interest, since everyone has a stake in, and should think critically about, the setting in which they work.

The Changing Relationship Between Policy, Science and Society

It is clear that any organisation wishing to translate knowledge into policy advice must reflect on the profound recent changes observed in the science, society and policy nexus. These changes, many of which have been discussed in other parts of this book, could be summarised as follows:

First, *the world of policy is changing*. In today's highly interconnected societies and economies, policymakers have to deal with hugely complex systems and systems of systems. As a result, many of the policy challenges they face are 'wicked'. In other words, they bleed into each other, so that their scale and scope is difficult to define. They do not have clearly identifiable 'one-off' solutions. Success cannot be easily measured.

Second, *the knowledge landscape is also becoming very fluid and incredibly rich*. In the past, knowledge was produced by universities, mainly in North America and parts of Europe. Now, there are excellent universities in many parts of the world. Moreover, a whole host of other entities are also producing knowledge, including digital platforms, industries, fab labs, etc. It is not just those with recognised qualifications, e.g., PhDs, producing knowledge, it is citizen scientists and young entrepreneurs.

This creates huge opportunities and also challenges. It can be difficult for us to know which data, information or knowledge we can trust (see more in [Chapter 10](#)). At the same time, the old, trusted, established knowledge outlets have lost or risk losing – at least part of their authority. Just as in the media landscape, the old reference points are dissolving. This makes it harder and harder to get our bearings. It is as though we are sailing on a sea of knowledge and finding it difficult to navigate. There is an urgent need for organisations that can help policymakers and others to make sense of the deluge.

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Equally, some of the knowledge being generated is not strictly speaking ‘scientific’ but it is nevertheless valid and useful. For example, new methods of discovery are emerging, driven by the availability of ‘big data’ (see [Chapter 9](#) for possible evolutions that can result from that). Unlike the scientific method, which is based on the formation of hypotheses, these methods are inductive, based on picking out patterns and correlations in the data. Much of this work may not be reproducible, as the scientific method requires, because the data on which it is based are constantly evolving.

This creates a new role for science and scientists: to help to distinguish between poor/false knowledge and relevant, verifiable, authoritative knowledge. The border line should not be made between ‘scientific’ and ‘nonscientific’ knowledge but between false and real facts. If science was able to embrace a role of a verifier of quality of arguments, it would strengthen its legitimacy to hold a privileged position in the policymaking process.



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Third, the *social context is changing*. Trust in policy elites has diminished following the crisis.

The picture as regards trust in scientists is more nuanced, but there are causes for concern. For the moment, surveys show that scientists are held in high esteem ([Special Eurobarometer 401, 2013](#)), but this could change given the current very low levels of trust generally. The media has picked up on science’s reproducibility crisis, and this may filter through to public opinion in time. People are inspired by breakthroughs in fundamental science, such as the confirmation of the existence of the Higgs Boson. However, when science is used for policy, it is becoming more hotly contested.

This may be because the stakes are higher and the issues facing regulators are more important. New technologies have a profound effect on almost every aspect of people’s lives. There has been longstanding concern about the use of technology in nutrition, but this now extends to other issues, such as algorithms, which can be used for recruitment and many other purposes, including policy decision-making. Many people have the feeling that the issues are too complex for specialised scientists to understand them ([Special Eurobarometer 340, 2010](#)). On the top of everything, the speed of the change is accelerating enormously. Penetration of technologies that took in the past a few decades is now taking less than 5 years. Moreover, because the stakes are so high, people may feel that business and other interests may seek to influence scientists and that scientists may not be immune to these pressures ([Special Eurobarometer 401, 2013](#)). These fears may be exaggerated, though there are documented cases of this happening.

Finally, the *Internet changes everything*. Everyone can express a view. This is immensely positive, but it carries risks. The authority of scientists and other experts is being challenged. A certain degree of scepticism about ‘expertise’ is warranted; it may be a sign of maturity not barbarism ([Saltelli, 2017](#)). However, if people do not defer to experts, they face tough challenges in deciding which evidence or other material they should trust.

One thing is certain: whether one views this as a positive development or not, it is no longer possible for political or technocratic elites to decide, on their own, which issues to tackle, which perspective to view them from and which knowledge to use as a basis for decisions. These issues have to be decided more collectively.



The Importance of Boundary Organisations and Skills

Based on our experience, the following sections will look at (i) the way in which science advice should be organised to cope with today's rapidly changing environment and (ii) the functions that science advisory organisations should fulfil.

The way in which science advice is traditionally 'institutionalised' naturally differs between countries and entities, depending on culture, context and history. However, there are two points which are worth making:

First, in some (mainly Anglo-Saxon) countries, a single individual performs the role of Government Science Adviser. The Commission itself experimented with this model in 2012.

Unfortunately, although it works well in some cases, this model has significant drawbacks. It depends too much on the calibre of the single individual appointed to the post. It concentrates a lot of influence in the hands of that one individual. This means that, when advice is given, it can be perceived as representing the subjective views of that person. It is clearly a disadvantage, and also a common feature built in the Science for Policy 1.0 model.

Due to the growing complexity and importance of decisions, it seems to be wiser to put in place advisory groups or structures, where the constant interactions between scientists and policymakers are allowed.

Second, while a wide range of different organisations and institutions should be involved in providing advice to policymakers, one type of organisation has a particularly important role to play, that is, 'boundary organisations', i.e., those which sit at the intersection of science or knowledge and policy.

In the past, science advice might have been seen as an ordinary service, like those provided by consultants. A specific client, a policymaker, might request a piece of research relating to a particular issue. The scientist would carry out the research, hand over it at the beginning of the policymaking process and then have no further involvement.

This approach worked well when policy challenges, though difficult, were discrete, fairly easy to define and had clearly identifiable one-off solutions. However, with today's 'wicked' challenges, this simple, linear 1.0 approach no longer works, as explained in Chapter 1.

'Wicked challenges' rarely have definitive solutions, so scientists and policymakers have to stay in constant and ongoing dialogue with one another. This constant interaction is a key to mutual understanding, building trust and overcoming of the differences between scientific and policymaking cycles. This is the essence of Science for Policy 2.0, built on cocreation throughout the entire process of policymaking.

Equally, science itself does not necessarily provide clear-cut answers. Indeed, it has become less linear and more probabilistic. Scientists have to keep talking to policymakers to sensitise them to these limits and uncertainties.

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Science advice should therefore be fully integrated into the policymaking process. It should be like xenoliths in the rocks. They are of a different origin to the surrounding rock but fully embedded in it.

The JRC is part of the structure it is advising and it brings a huge advantage in science–policy interactions. However, this is not essential. Other alternatives and more innovative solutions can achieve the same result, if they adopt a cocreative philosophy and practices, for example, science for policy institutes at universities or academies with a direct link to the governments (shared employment). Another solution would be thematic policy platforms established across different research organisations nationally or internationally regrouping the best experts in the given policy area and cooperating with a relevant ministry (for example, a platform on the agriculture research may provide a space for the researchers from the relevant fields and be in contact with the policymakers at different levels of government or regulatory agencies).

What really matters is the attitude of those involved and the relationships that they have with each other. That is why, as part of its reform, the JRC sought to change the way it works with other parts of the European Commission. The aim is to work together with them closely and iteratively and, crucially, in a relationship of equals. The institutional setup helps, but it is the cultural change that helps forging better collaboration.

Just over 3 years into the implementation of the reform, it is clear that the attitude of policymakers in the Commission towards the JRC is much more positive. They see it as a strategic partner, not a consultant. They are also more ready to acknowledge the scientific contribution and accept the scientists at the very early stages of their policy reflections.

In fact, they have perhaps been more open to this change than JRC scientists themselves. This may be because policymakers have more incentive to strengthen their relationship with scientists. It is they, after all, who are directly responsible for solving ever more complex policy problems. It is they who are in the firing line.

On the other hand, some of the scientists remain, perhaps, driven more by their intellectual curiosity than by policy concerns. They may be motivated primarily by the esteem of the scientific or academic community, rather than by the impact they have on policy. This behaviour is a serious impediment to the full use of science in policy. We think that we need a new type of scientist driven by the scientific curiosity, academic reputation as well as by a policy impact.

A New Type of Scientist for Policy Impact

To find a balance between policy impact and academic curiosity is not easy. We are seeking to promote the emergence of this new profession by developing and testing different approaches:

- We developed a special competence framework for scientists and policymakers engaged in the use of science in policy (see [Chapter 4](#)). We are providing both groups with a specialised training, and at the same time, we developed joint sessions to allow mutual understanding to grow.

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- Different forms of detachments, short- to mid-term mobility schemes for the scientists towards the policy departments and vice versa were introduced (see [Chapter 6](#)).
- The thematic communities of practice were established and they play an immensely important role in mutual understanding between scientists and policymakers (see [Chapter 7](#)).
- At the same time, we have launched a ‘Collaborative Doctoral Partnership’ programme, which allows PhD students from around the EU to spend time working in the JRC, so giving them experience of working in a European ‘science for policy’ environment.

While this entire handbook helps scientists with a transition to this new role, [Chapters 4, 5 and 10](#) in particular are a good starting point to learn how to manage the change.

Which Functions Should Boundary Organisations Fulfil?

If the current rapidly changing situation cements the importance of boundary organisations, it also calls for changes in the functions that those organisations fulfil. We clearly see three major functions that are key for the boundary organisations to embark on:

Lighthouses in the Sea of Knowledge

The knowledge organisation’s focus had always been to create new scientific knowledge by carrying out its own research work. This needs to change. Managing the existing knowledge, verifying it and making sense for different purposes should become an additional dimension of every knowledge organisation. In 2016, we, in the JRC, decided to do this and add a new function, that of ‘managing’ knowledge from other sources – i.e., collating and analysing it and presenting it to policymakers in a coherent and digestible form. It did not mean to abandon the knowledge creation but to complement it.

Achieving the shift required a culture change across the whole JRC, a change in the mindset of almost everyone working there. Although this change is not yet complete, good progress has been made, thanks to a number of factors:

- A strong impulse from the head of the organisation
- An openness to ideas and insights from staff at all levels
- Staff ‘ambassadors’ whose role was to inform colleagues about the new approach and encourage them to buy into it
- The creation of a new ‘Knowledge Management Directorate’ charged with identifying or developing knowledge management methodologies and delivering specific training to staff in core knowledge management skills, e.g., systematic reviews and metaanalyses, data analytics, data visualisation, info graphics and management of communities of practice



Boundary organisations, which sit at the intersection of science and policy, are vital because they allow constant interaction between scientists and policy makers.





- The creation of a special ‘knowledge management unit’ in all the other Directorates of the JRC. Their mission is to spearhead the drive towards knowledge management in their Directorates. They report to the head of their Directorates (their Directors) but are also connected to the Knowledge Management Directorate in a flexible matrix structure
- Producing a set of flagship knowledge management products (reports) showing in concrete terms what could be the policy impact of a well-chosen topic.

We decided also to create specific tools for the vertical and horizontal knowledge management. Vertical knowledge management instruments – ‘Knowledge Centres’ – are the thematic virtual hubs collecting the most relevant pieces of knowledge in certain vertically defined areas (like disaster risk management, food security, food authenticity, migration and demography, etc.). These bring together expertise and knowledge from different locations inside and outside the Commission. Their job is to inform policymakers in a tailored, concise and independent manner about the status and findings of the latest scientific research. They clearly present any legitimate disagreements within the scientific community and seek to quantify the level of uncertainty associated with the available knowledge. Horizontal knowledge management is represented by our ‘Competence Centres’ that are pulling together all scientific competences of the JRC in certain field (creation of composite indicator and dashboards, modelling, text mining, impact evaluation, etc.). For an example, see [Chapters 6, 12, 16 and 19](#).

The shift towards knowledge management – or sensemaking – could be emulated by other organisations working with other parts of society, e.g., business – not just those who work with policymakers, as the JRC does. Making sense of knowledge is a challenge for the whole society. If almost all players are now producing large amounts of data and knowledge, they are also all struggling to cope with the deluge that is being created.

There is therefore room for many organisations to take on the role of ‘lighthouses’, including administrations at all levels, regulatory organisations and even central banks. Indeed, one could argue that it is only their ability to make sense of knowledge that gives these nonelected bodies their legitimacy. If knowledge-based organisations do not embrace the role of the lighthouses of authoritative knowledge, they will leave more space for false or fake facts and ultimately contribute to the creation of the postfact society where the space for the scientific knowledge creation will be limited or none.

Breaking Boundaries Between Disciplines and Policies

Today’s wicked problems need to be viewed from different angles, if we are to have any chance of comprehending them.

Along with breaking boundaries between knowledge and policy, it is therefore increasingly necessary to span the boundaries between scientific disciplines and policies.

The JRC starts with an advantage; it works across the full range of EU policy fields and it also employs scientists from a huge range of disciplines.

However, working across disciplines is notoriously difficult. The structure of many academic institutions discourages multidisciplinary collaboration. It may be difficult to obtain funding and opportunities for publication may be limited.



While the situation is improving in some countries, many of these barriers remain. Most scientists employed by the JRC work there for a limited period before returning to their universities. They are therefore not immune to these concerns.

At the same time, the European Commission, like all public administrations, is a hierarchical organisation divided into different departments (Directorates General). This has benefits (efficient allocation of resources, clear lines of accountability), but it can also create silos.

Moreover, the JRC has its own hierarchy and divisions (it is made up of 10 Directorates, each one comprising 6–8 units).

Overcoming silos therefore means transcending the organisational structure, without abandoning or undermining it. To achieve this, the JRC has taken the following steps:

- It has chosen to organise its work, not around individual areas but around ‘priority nexus’ which link different issues, e.g., migration and territorial development or food, nutrition and health. This ensures that linkages are made.
- It prioritises projects involving many different parts of the Commission. At an early stage in policy development, different departments may have different points of view. It is important that they frame the research questions together, so that they can all accept the results of the research.
- A creation of an internal communication platform, which is now being rolled out across the European Commission, was a crucial step in making different parts of the organisation connected and to unzip the people’s tacit knowledge. The platform allows information to be shared and groups to be created by colleagues at any level in the organisation. Take up by staff has been very rapid, thanks to a concerted campaign and training available to all. It has proved a very powerful tool for cross-unit and cross-Directorate collaboration.
- A digital platform was complemented by different physical ‘Collaborative Spaces’ to allow scientists from different sites, directorates and units to spend some time working together in the same physical space.
- The launch of new generation of JRC ‘transversal projects’ has proved to be a spur for collaboration. Tangible outcomes of the transversal projects are multidisciplinary reports that would never occur within the traditional settings (e.g., on Resilience ([Campolongo, 2018](#)), What makes the society fair? ([Al Khudhairy et al., 2017](#)), Artificial Intelligence ([Craglia et al., 2018](#)), Blockchain ([Nascimento et al., 2018](#)), etc). Staff members are keen to be involved in them, and this encouraged them to come forward with interesting, cross-cutting proposals (Future of work and education, Connected and automated transport, Future of Cities, Geography of Discontent).

Cross-disciplinary cooperation has helped to close the gap between natural and social sciences. This is important in all societal challenges we face. Separation of social sciences and humanities from natural, medical and technical sciences is hugely counterproductive and may lead to many mistakes in policy decisions.

Breaking Boundaries Between the Academic and Nonacademic Realms

Along with breaking barriers between academic disciplines, it is often necessary for boundary organisation to bridge the gap between policymakers and academics, on the one hand, and practitioners or stakeholders, on the other. This is because, when tackling complex policy problems, it is important to take all relevant perspectives into account.



Saltelli and Giampietro (2017) advocate, inter alia, direct interaction with social actors carrying legitimate but contrasting normative values to avoid a compressed framing of issues which then forms the basis for quantitative analysis. The result is a restricted understanding of the issues, given a spurious impression of precision by that quantification.

In fact, the European Commission makes strenuous efforts to take account of all relevant points of view when framing policy options. This is a key part of its impact assessment methodology. It is done using a number of mechanisms, such as the 'Your Voice in Europe' portal.¹ However, the JRC has also built in some safeguards. Since it has developed a relationship of equals with its policymaking counterparts in the Commission, it is able to jointly frame research questions with them (see more in the Chapter 6). There is no question of policymakers framing these questions on their own in response to the pressures they are under.

The engagement (of different science disciplines, stakeholders, regional/local representations, civil society organisations and citizens) is a key feature of the success for policymaking. We need to invent more efficient and more genuine forms of engagement. We did a few first steps in this direction and invented a 'Policy Lab'² (see more details in Chapter 13), which facilitates participatory processes, using sophisticated tools and methodologies. The processes allow policymakers, scientists and stakeholders to frame policy and research questions together and to decide on the type of knowledge which should be produced or mobilised.

A Stronger Culture of Anticipation and Thinking out the Box

In 1993, Funtowicz and Ravetz coined the term 'Post-Normal Science' to describe situations where 'facts are uncertain, values in dispute, stakes high and decisions urgent' (Funtowicz, S. Ravetz, J.R., 1993) (see Chapter 2). This formulation has proved to be very prescient. It was true when it was coined but perhaps even Funtowicz and Ravetz themselves could not have imagined how much truer it would be today.

The unprecedented pace of technological development has indeed created myriad interconnections which result in 'wicked' challenges for policymakers. It has created high stakes policy issues that frequently give rise to clashes in values. It has created an explosion of data, information and knowledge, resulting in complex epistemological challenges for policymakers and indeed society at large.

However, it is the last part of Funtowicz and Ravetz's formulation, which refers to decisions being urgent, that is the most important. Decisions are often taken hastily without time for mature reflection. With today's unprecedented and ever increasing pace of change, it is becoming harder and harder for policymakers to stay ahead of the curve.

Where options are narrowly framed, it is not necessarily in response to pressure from particular interest groups; it may just be due to time pressure. The public is demanding more inclusive policy processes, but there is often no time to organise them. Expectations are growing, but time is increasingly short.

The only way to square this circle is to spot issues early so that work can begin on them as soon as possible. For this reason, the JRC is strengthening its anticipatory capacity. It already has many of the necessary capacities and tools, including horizon scanning,

¹https://ec.europa.eu/info/law/contribute-law-making_en, accessed 05.05.2020.

²<https://blogs.ec.europa.eu/eupolicylab/>, accessed 05.05.2020.



technology watch activities, foresight processes, modelling and media monitoring. It is building expertise in the use of these tools and developing new ones (for more, see [Chapter 12](#)).

All new JRC projects must take account of possible or likely future scientific, technological and other developments that can impact on or be relevant to the matter in hand. It is embedding an anticipation culture across the organisation. It is an important cultural change from backward looking approach to forward looking. It is the only way how to shape the collective mind of the organisation in order to cope with the fast changing reality.

Nurturing creativity and ‘out-of-the-box’ thinking is an important ingredient of the anticipatory culture. In this respect, nothing more than active engagement with art is helping to look at things from unconventional angle. This was the main driver of our Science and Art programme where artists are invited to join JRC scientists to discuss, reflect and innovate and to place JRC research into a wider context of science–art–policy–politics. It started very low profile back in 2015 and is growing almost exponentially since. So far, it has tackled issues such as food, fairness, artificial intelligence or ‘big data’ and has provided some unexpected insights.³

³See more at <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC107774/kjna28727enn.pdf>, accessed 05.05.2020.