European Parliament

Evidence for policy-making

Foresight-based scientific advice

SUMMARY

The implementation of foresight routines will help in preparing future policies. Evidence-based foresight practices will ensure that policy-making is trustworthy and future-fit.

This paper is partly inspired by the evidence-related policy issues encountered in managing the coronavirus outbreak. The Covid-19 crisis was, and remains, characterised by uncertainties and evidence that change by the hour through progressive insight. Policy-makers had to make decisions that balanced expert advice and presumed feasibility and public acceptance. Additionally, new virus- and vaccine-related evidence meant they had – and continue to have to – constantly review measures, in these exceptional times of uncertainties and evolution of insight, when experts' advice was occasionally inconsistent.

This briefing first details the role of evidence in the policy ecosystem, with separate sections regarding science for policy and science- and technology-related policy. Subsequently, an evidence-based mechanism is suggested for rapid response during crises or emergencies.

The paper concludes with four practical tips for trustworthy policy analysis: (i) seeing the broader picture; (ii) exploring possible biases; (iii) examining the policy issue from different perspectives; and (iv) stress-testing policy options by widely assessing possible impacts of the options considered.

Introduction

Some definitions

The exploration of various reference works helped construct some helpful definitions:

- **Evidence**: facts, signs or objects that are used to prove whether something is true or not.
- **Scientific evidence**: information gathered from scientific research.
- **Policy-making:** the process of formulating new policies.
- **Evidence-based policy**: policy backed up by a solid body of scientific research or derived from or informed by objective evidence.
- **Foresight**: the ability to see what will/might happen in the future and to use this to prepare for the future.
- **Foresight methods**: practices that support being pro-active in view of events that might possibly happen in the future, for example, horizon scanning or scenario techniques.
- **Horizon-scanning**: systematic process of scanning trends, possible developments or changes.

Author: Lieve Van Woensel

PE 690.529 – March 2021

Evidence-based policy-making

This paper deals with 'evidence-based policy-making', as it uses the best available scientific evidence to formulate policies. However, 'evidence-based policy-making' does not imply that policy decisions should be taken solely based on scientific evidence. Policy decisions based exclusively on scientific evidence are technocratic, which is not a policy's aim in a parliamentary democracy. Democratic policy-makers usually combine the best available evidence with their understanding of a society's needs, i.e., contextualising the evidence in terms of what they believe is in accord with the citizens' expectations, values and preferences.

The policy ecosystem

Policy-makers help prepare society for the future. They act to solve problems and improve people's quality of life considering their concerns, needs and suggestions. When focusing on the EU's resilience, policy-making activities could be considered in the context of the policy ecosystem. A joint publication by the OECD and the International Institute for Applied Systems Analysis (IIASA), 'System Thinking for Policymaking'[1] extrapolates evidence-based decision-making to a broader systems approach and emphasises the potential of systems analysis to address various policy challenges. Typical policy issues are the decarbonisation of the energy system, fighting plastic pollution or ensuring a sustainable food system.

The policy ecosystem includes policy-makers, the scientific community that provides evidence, and everyone who can affect or be affected by a policy. The policy ecosystem is dynamic and complex and encompasses the entire society, including all the relevant stakeholders.

Constituents of a policy ecosystem:

- Policy-makers
- Scientific advisors
- Scientific community
- Societal stakeholders
- Special interest and pressure groups
- Media

Additionally, the ecosystem involves all the interconnections between the 'parts'; the individual environment of every actor for instance, because it influences the actor's views.

Evidence in the policy ecosystem

The need for evidence throughout the legislative cycle

Whether for the daily functioning of the European Parliament, or for discussion of emerging topics or crises, a need for scientific evidence can arise throughout the legislative cycle. Evidence should be accessible for analysis for priority issues[2] such as climate change and its consequences, the European digital market, improving public health, dealing with the migration challenge, or ensuring energy and food security. Furthermore, where there insufficient evidence exists, Parliament should ensure the approach to collecting evidence and calling upon external expertise is fit for purpose. In addition to the known priorities, new topics that might call for action can emerge at any time – for instance, the issue of lead poisoning among children, brought to light by a Unicef report. The possible impacts of such developments need to be examined, as they might require a coordinated and rapid response to avoid escalation.

Similarly to the Covid-19 crisis, Parliament can be confronted with unexpected crises with disruptive capacities, for which adequate evidence might not exist or be available. One of the specific characteristics of the current crisis is the lack of available, adequate and assessed evidence. Knowledge about the SARS-CoV-2 virus changes continuously. Policy measures have to be taken in a situation of 'progressive insight'. Furthermore, the impacts of the Covid-19 crisis and the measures to fight it are visible in all aspects of society. They require continuous scanning, assessment and adjustment in an interdisciplinary setting that involves all the relevant stakeholders. Evidence-based analysis of the topic and the overall situation can help in formulating decisions about the measures to be taken in the overall contingency planning.

For crisis-response policy activities, Parliament needs a rapid response mechanism. Depending on the nature of a crisis, in addition to the access to the available scientific evidence, Parliament also requires an adequate procedure to collect reliable evidence quickly.

The limitations of scientific evidence

Scientific evidence helps in describing the manner in which things work and understanding which facts are true or false according to a scientific method. However, science does not convey how to use the evidence; scientists that provide the evidence do not dictate how their gathered evidence should be used. Despite evidence that highlights a solution's effectiveness, such evidence does not conclude that the described solution is an appropriate response to a given policy problem. These decisions are in the hands of policy-makers and their advisors.

> Policy-makers must balance the scientific evidence in the overall societal context, and must make trade-offs.

Scientific advice for policy-makers

Evidence for policy-making

Generally, scientific policy advice should be sound, unbiased, legitimate and publicly accessible. Scientific advisors and other policy analysts are the guardians of the advisory process and responsible for ensuring that their policy advice is impartial and practical. They should work as **honest brokers**, formulating a set of politically neutral policy options for the policy-makers' consideration. Pielke[3] warns communicators of science to policy-makers to be aware of the diverse roles they can play. He challenges those communicating science to policy-makers to be deliberate about how best science can contribute to policy-making in a healthy democracy. Neither scientists nor policy analysts make policies, they only gather and analyse scientific evidence. Deciding on a policy entails choosing from policy options with different trade-offs between societal costs and benefits, and this choice should rest with those mandated to take such decisions.

A significant challenge for communicators of scientific evidence is recognising the policy-makers' level of scientific knowledge. It is therefore vital to formulate evidence-based advice in a policy's social context and communicate it to policy-makers in a format that considers their scientific knowledge level and the time they have available to come to a full understanding.

Evidence for policy-making in times of crisis

In times of health crises, policy-makers face the challenge of making health-related decisions under time and resource constraints, and research evidence is only one of the many factors that can influence their decisions. According to Khalid[4] et al., five actionable strategies make health research accessible and available to policy-makers:

1. Strengthening up-to-date and accessible research evidence websites,
2. Establishing key networks to coordinate and share quality and timely evidence,
3. Providing rapid evidence summaries,
4. Turning research evidence into explicit actionable points such as checklists, and
5. Increasing the value of evidence usage to inform interventions.

Science- and technology-related policy

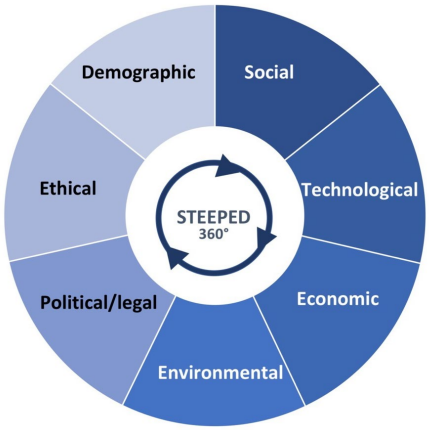
A specific evidence-related area in policy is policy-making on science- or technology-related issues, such as artificial intelligence, climate change or nuclear energy. Technology that is entrenched in our daily lives gives rise to a wide range of policy issues, including on safety, privacy, security, ethics and the environment. In Europe, the potential impacts of technological developments also contribute to detailed technology assessment studies. Technology assessment (TA) is a scientific,

interactive and communicative process that aims to contribute to the formation of public and political opinion on societal aspects of science and technology.

Ideally using a 360-degree approach, TA studies assess the possible impacts of technology and related innovations on all aspects of a society. At the European Parliament, such assessments are typically conducted by the Scientific Foresight Unit, as a part of its core task, for the Panel for the Future of Science and Technology (STOA), or by various policy departments. Often foresight-based, TA studies result in briefings with policy options, assessed according to their possible impacts on all aspects of society, aimed at informing the Members and committees in the most scientific way possible, to help them in making the decisions and choices that prepare a society to use such technologies in the future.

The STEEPED Scheme (see Figure 1) is a helpful tool to ensure that a technology-related issue is investigated along the most extensive range of perspectives – through a 360-degree approach.

Figure 1 – A 360-degree approach (STEEPED)



Source: A Bias Radar for Responsible Policymaking © 2020.

Foresight-based policy-making

Foresight in a nutshell

Foresight is a planning-oriented discipline collecting and processing information about the future environment. It is a process for thinking about the future systematically, which aims at boosting capacity in preparation for what could happen or could be needed in the future.

Foresight ensures critical thinking that is concerned with both short- and long-term developments. By envisioning a wide range of possible developments from likely to very unlikely, from desirable to undesirable, intended to unintended, foresight explores imaginable futures of new or ongoing developments and assesses their potential impact on a society.

Basic traits in foresight exploration:

- Holistic
- Inclusive and participatory
- Interdisciplinary
- 360-degree view
- Aware of biases
- Considering possible impacts

While **strategic foresight** is a planning-oriented discipline and can lead to the development of common visions for all kinds of organisations, **explorative foresight** has the potential to foster anticipatory governance, i.e., future-proof policies.

Foresight for insights beyond the evidence

To avoid possible issues with public acceptance of policy measures, or with certain stakeholders' concerns, foresight may help prepare policies more efficiently. Foresight's purpose in the policy process is to enable evidence-based policy options to be weighed in their overall societal context, and to anticipate how stakeholders' concerns may possibly affected by the considered measures.

Foresight therefore enhances policy-makers' ability to anticipate the possible future impacts of their policies on society and to plan for these impacts in advance.

Foresight-based analysis of evidence ensures a sharper focus on policy issues.

While evidence informs policy and society with trustworthy knowledge and about what is true or not, the role of foresight in policy is complementary and wider than scientific evidence. It cannot however function without evidence. Foresight explores the evidence in the context of the entire policy ecosystem.

Major steps in the foresight process include:

- First, 'horizon scanning' provides information on what is known today (evidence and facts) and adds insights about what can be envisaged to happen in the future, including what is less likely to happen and what is plausible, and including desirable and undesirable futures.
- Second, by applying scenario methods, foresight facilitates the policy-making process, by helping to build insights as to what policy should be prepared for.
- Finally, by backcasting these envisioned scenarios on which policy should be prepared to the body of legislative texts, foresight adds a 'stress testing' function to the policy-making process, which adds trustworthiness to the assessment of policy options in policy analyses.

In practice, 'horizon scanning' is the systematic process of scanning trends and directions in which something is developing or changing, such as the recent European Parliament trends reports:

- F. Debié et al, 'Towards a more resilient Europe post-coronavirus: An initial mapping of structural risks', EPRS, European Parliament, July 2020, which provides a significant foundation for Parliament's preparedness on potential risks.
- 'Trendometers' are another cornerstone of anticipatory governance. With a focus on geopolitical issues, these papers identify, track and analyse trends across social, economic and political fields.[5]

An example of scenario-based foresight and its outcomes on anticipatory policy-making can be found in scientific foresight studies conducted for STOA, for example:

- A 2016 scientific foresight study, Ethical Aspects of Cyber-Physical Systems, the outcomes of which are presented in an animated infographic.

Foresight as a stress-testing mechanism for policy

'Foresight is not about predicting the future, it is about minimising surprise.'

Karl Schroeder (2011)

Scenario-based foresight allows the mapping of pathways that are likely to lead to, or away from, envisaged future scenarios. This mapping can also be called backcasting and identifies how possible future scenarios can be reached starting from the current situation. It is therefore also effective for testing how policies are prepared for possible futures, i.e., for 'stress-testing' policies. In the policy context, 'stress-testing' identifies the weaknesses of the policy measures and verifies how these are equipped for possible future developments. In practice, for constructing a set of diverse scenarios for stress-testing, it is important to think beyond what is likely to happen. Developing narratives for 'stress-test scenarios' usually starts from the available evidence. To assemble a set of diverse stories about the future, it helps to consider people's extreme hopes and fears.

To conclude, foresight thinking may be seen as the backbone of future-proof policy-making.

Scientific advice mechanism for rapid emergency response

During a crisis, we, at the European Parliament, need a rapid analysis of the crisis-issue based on the available evidence, even real-time, which can be dynamic, demanding constant updating.

A crisis management capacity for the Parliament relates to the capacity to provide scientific and technical advice to support the EP during emergencies.

During a pandemic, it is important for political decision-makers to be guided by scientific advice. Especially at its inception, the Covid-19 pandemic was characterised by various uncertainties: new evidence emerged almost daily, confusing the public, policy-makers and scientists, who had to constantly, and are continuing to, review and revise their opinions and advice. While responding to scientific advice and taking decisions based on that advice, policy-makers have to keep the socio-economic costs of certain measures and their presumed public acceptance in mind.

First, Parliament needs the capacity to assess the broader picture of the issues involved in any crisis quickly. Members need a crisis response mechanism that can be activated swiftly and which involves diverse expertise. Examples of such an emergency framework includes the UK's Scientific Advisory Group for Emergencies (SAGE) and the Council of the EU's Integrated Political Crisis Response (IPCR) mechanism.

A rapid response capacity would ensure both speedy scientific information-sharing and the production and dissemination of analytical science- and evidence-based briefings to support Parliament's policy-makers and analysts. Additionally, both Members and staff need to be alerted about fake news regarding an ongoing crisis, a function that has been already taken up by the European Science Media Hub (ESMH).

As a part of their recommendations to address the coronavirus crisis, the OECD[6] summarised the main principles in building an effective and trustworthy science advisory process:

- Have a clear remit, with defined roles and responsibilities for its various actors.
- Involve the relevant actors, including scientists, policy-makers and other stakeholders, as necessary.
- Produce sound, unbiased and legitimate advice.

A rapid response mechanism includes a fast-track procedure to identify the relevant experts and modalities, and to quickly involve them in an advisory role. It requires agreements on the advisory processes' transparency, and assessment of the envisaged measures on their feasibility, concerns and acceptability.

Trustworthy evidence-based policy analysis: Tips and tricks

To prepare society for the future, policy-makers must make strategic policy choices to anticipate more general challenges, threats or trends.

The European Parliament's services, particularly its policy analysts, support Parliament, its committees and Members, with independent, objective and authoritative analysis. Implementing the four pathways in policy analysis methods described below will add increased trustworthiness in the process of preparing evidence-based and future-proof policy advice. Trustworthy policy advice entails the use of explorative foresight, systems thinking, and ensuring an inter-disciplinary and multi-perspective approach alongside bias awareness, as well as the anticipation of undesirable impacts. A harmonised approach for critical/impartial analysis for responsible and trustworthy policy advice should therefore include the four 'good practices' described below.

Good practice 1: Zooming out to the broader picture

Exploring the topic and its ecosystem: examining an issue's scope, including where the most up-to-date reliable evidence could be found and conducting a stakeholder analysis (identifying those who are affected by or who can affect the issue).

At the outset of analysing the possible policy implications of an issue, e.g., a certain technology, it is important to take a step back to get a broader view of the ecosystem, to form an overall picture. Drawing a full picture of an ecosystem involves exploring the topic's scope and involving input from all the stakeholders.

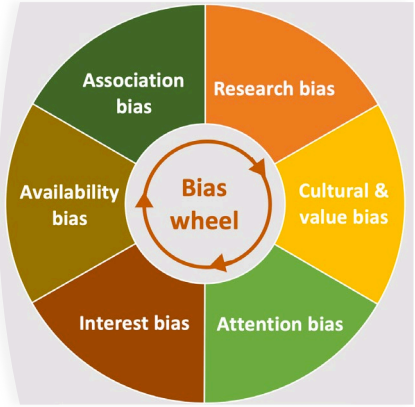
Good practice 2: Explore possible biases

Exploring possible biases (others' and yours): for the analysts themselves and the various actors and stakeholders that have been identified, as well as exploring their possible or known visions.

Understanding both your own and others' biases, leads to a more open-minded approach to analysis of an issue. Everyone in the ecosystem is subject to biases, prejudices or preconceptions. Such biases can systematically distort the perception of facts, affect how we make up our mind, how we weigh evidence and how we make assessments. They can both mislead and fool us. A Bias Radar for Responsible Policymaking[7] describes a series of biases and presents them in the form of a 'bias wheel' (see Figure 2), grouping some commonly appearing biases in a systematic way.

This wheel provides a tool to support bias-awareness, helping analysts to become more open-minded and reflective when dealing with evidence. This is especially helpful when considering emotive or controversial issues such as genetic engineering, nuclear technologies, chemical use or climate change.

Figure 2 – Bias-awareness tool (simplified)



Source: A Bias Radar for Responsible Policymaking © 2020

Good practice 3: Taking a 360-degree approach

Exploring the topic from a wide (360 degree) range of perspectives: using a STEEPED scheme to guide the process of scanning envisioned developments or events and their possible consequences for society.

When conducting foresight exercises, STOA applies a STEEPED approach to gain an insight into policy issues from different perspectives. A multi-disciplinary approach and the involvement of representatives from multiple stakeholder groups helps to understand an issue from several perspectives and envision any possible intended and unintended impacts (in the case of STOA, the policy issues studied are science- or technology-related). The STEEPED scheme (see Figure 1) is a checklist specifying seven lenses that examine the impacts of techno-scientific developments, thereby ensuring all areas of interest or concern are verified:

1. Social aspects
2. Technological aspects
3. Economic aspects
4. Environmental aspects
5. Political and legal aspects
6. Ethical aspects
7. Demographic aspects

Good practice 4: Assessing the possible impacts of policy options on other policies (stress-testing)

Assessing possible decisions on potential unintended impacts, on other policy areas for instance. Systematically conducting this assessment can avoid unpleasant surprises such as perverse effects of a policy. Such analysis can be termed 'stress-testing' of the policy options.

Possible unintended consequences may be circumvented by assessing the imaginable impacts (both intended and unintended) of the policy options in detail. It is recommended that all possibly

related policies are considered and possible intended and unintended effects of the options are investigated during analysis of a policy.

Analysts should, therefore, first identify such potentially associated policies by scanning the range of Parliament's competences. Once the relevant associated policies have been identified, imaginable consequences should be thought through for these possibly affected policies. This process comprises a policy stress test.

REFERENCES

Bassot E., The von der Leyen Commission's priorities for 2019-2024, EPRS, European Parliament, January 2020.

Debié F., (ed.) et al, Towards a more resilient Europe post-coronavirus: an initial mapping of structural risks, EPRS, with contributions of the Directorates-General for Internal Policies (DG IPOL) and External Policies (DG EXPO), European Parliament, 29 July 2020.

Hynes W., Lees M. and Müller J.M., (eds.), *Systemic Thinking for Policy Making: The Potential of Systems Analysis for Addressing Global Policy Challenges in the 21st Century*, Paris, OECD, February 2020.

Noonan E., Global Trendometer 2019, EPRS, European Parliament, December 2019.

Khalid A.F. et al, *Supporting the use of research evidence in decision-making in crisis zones in low- and middle-income countries: a critical interpretive synthesis*. Health Res Policy Sys 18, 21, 2020.

OECD, *Providing Science Advice To Policy Makers During COVID-19*, May 2020.

Pielke R. Jr., *The Honest Broker: Making Sense of Science in Policy and Politics,* Cambridge University Press, 2007.

Van Woensel L., Kurrer C. and Kritikos M. (eds.), Ethical Aspects of Cyber-Physical Systems: A Scientific Foresight Study, EPRS, European Parliament, 2016.

Van Woensel L., *A Bias Radar for Responsible Policy-Making. Foresight-Based Scientific Advice*, Palgrave, 2020.

ENDNOTES

1 W. Hynes, M. Lees and J. Müller (eds.), *Systemic Thinking for Policy Making: The Potential of Systems Analysis for Addressing Global Policy Challenges in the 21st Century, New Approaches to Economic Challenges*, OECD Publishing, Paris, 2020.

2 See E. Bassot, The von der Leyen Commission's priorities for 2019-2024, EPRS, European Parliament, January 2020.

3 R. Pielke, Jr, *The Honest Broker: Making Sense of Science in Policy and Politics,* Cambridge, Cambridge University Press, 2007.

4 A. F. Khalid et al, *Supporting the use of research evidence in decision-making in crisis zones in low- and middle-income countries: a critical interpretive synthesis*, Health Res Policy Sys 18, 21, 2020.

5 E. Noonan, Global Trendometer 2019, EPRS, European Parliament, December 2019

6 See OECD, Providing Science Advice To Policy Makers During COVID-19, May 2020.

7 See L. Van Woensel, *A Bias Radar for Responsible Policy-Making. Foresight-Based Scientific Advice*, Palgrave, 2020.

DISCLAIMER AND COPYRIGHT

eprs@ep.europa.eu (contact)

www.eprs.ep.parl.union.eu (intranet)

www.europarl.europa.eu/thinktank (internet)

http://epthinktank.eu (blog)