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# How to Build a Reciprocal Relationship Between Research and Decision-making?

YOUNG ACADEMY FINLAND

TIINA AND ANTTI HERLIN FOUNDATION

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Further information on the results of the workshops organized as part of the "Young Researchers as Knowledge Brokers" project can be found on the website of Young Academy Finland.

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## Executive Summary

The challenges concerning the Finnish and other European science advice mechanisms have been highlighted during the COVID-19 crisis of the spring of 2020. At the same time, science advice has proven to be undeniably important. In the future, the increase of such wicked problems as pandemics, climate change, and loss of biodiversity should be taken better into account, and the forms of interaction between science and policy should be reconsidered. It is important that sufficient investments are made now to increase the efficacy of science advice systems even further.

Sustainable, adaptable, and reliable science advice must be based on varied, transparent, partly overlapping, and genuinely multivoiced mechanisms that allow a presence also for early-career researchers. When science advice mechanisms are being created, we should pay attention, based on relevant research, to the type of expertise that is supported (Gustafsson et al. 2019; Spruijt et al. 2014), whose expertise is considered valid (Jasanoff 1994; Turnhout et al. 2016), and how the science advice is institutionalized (Lentsch & Weingart 2011; Budtz-Pedersen 2016).

Diversity must be one of the objectives for designing a science advice system. Diversity can be created for example by simultaneous unofficial and official models of interaction, as well as long-term and shorter-lived models. Unfortunately, an easy, overarching solution consisting of a single template or mechanism does not exist. Further, through multiple channels continuous interaction is enabled better also in times between urgent needs. Hereafter, the expertise and networks of national science academies, scientific associations, research organizations, and various boundary organizations could be used more effectively alongside the official science advice mechanisms linked directly with the government, complementing them.

In order to support Sofi, a joint venture of the four Finnish science academies for the development of national science advice, Young Academy Finland carried out the "Young Researchers as Knowledge Brokers" project with the support of the Tiina and Antti Herlin Foundation. The project aimed to identify the various mechanisms and initiatives that are used by the European young academies to build connections between the decision-makers and early-career researchers. The project that ran from September 2019 to August 2020 included a literature review, a short survey, interviews, and discussion workshops. The aim of the project was to compile a basic information pack of the mechanisms used by European young academies, but also to identify novel, inclusive approaches to bringing researchers and decision-makers together. We focused particularly on finding such mechanisms that would allow researchers interactive and regular access to the political environments (AAAS 2017). This differs from an approach where the impact of scientific knowledge is only increased by raising the volume of knowledge. The policy recommendations provided below are based on the findings of the "Young Researchers as Knowledge Brokers" project.

1. Increase reciprocal action between knowledge and decision-making
2. Support the inclusion of early-career researchers[1] in the mechanisms of science advice
3. Transfer the responsibility for the performance of science advice from individuals to mechanisms
4. Develop and diversify the funding opportunities for science advice mechanisms
5. Base the development of science advice as a practice and its mechanisms on relevant research on the relationship between science and policy

## 1 Increase reciprocal action between knowledge and decision-making

It is often thought that by enhancing the flow of information toward political decision-making we can reduce the wickedness of complex problems and transform them through knowledge to become more technical and thus easier to resolve. However, climate change is an example of a wicked problem (Rittel & Webber 1973) where the increased volume of scientific knowledge has not led to the simplification of the problem nor a solution to it. In addition, increased scientific certainty does not mean that the ambiguity of knowledge, coming not just from multiple disciplines but multiple sources, is necessarily eliminated. Scientific knowledge is also not the only source of information needed by decision-makers and instead other sources, such as various advocacy organizations or interest groups, are required alongside scientific knowledge to support democratic decision-making. Thus, no problem – whether complex or technical – can be easily resolved by merely increasing the amount of knowledge or its availability in decision-making (Newman & Head 2017; SAPEA 2019).

A reciprocal relationship between science and decision-making promotes knowledge-informed decision-making. The mechanisms of science advice can be designed such that instead of just *gathering* knowledge and *transferring* linear knowledge they are also used to promote scientific and political literacy and multilateral understanding and trust (Lentsch & Weingart 2011; Newman & Head 2017). According to research that emphasizes the necessity of interaction between science and decision-making, the utilization of scientific knowledge in decision-making is, in addition to scientific quality, increased by the relevance and legitimacy of the science advice for the use of decision-making (Cash et al. 2003). The relevance of scientific knowledge means that the knowledge is significant and usable to the decision-making. The significance and usability of scientific knowledge for decision-making can be promoted through, for example, reciprocal science advice mechanisms and interaction, or intermediated joint functions (Lemos & Morehouse 2005; Perry & Atherton 2017; Miller & Wyborn 2018). Despite the interaction with decision-makers, scientific advice must retain its independence and integrity to ensure its credibility (Guston 2001; Cash et al. 2003; Lentsch ja Weingart 2011). Thus, science advice must be credible and significant to both researchers and decision-makers at the same time. Therefore, an interactive relationship does not mean that the decision-makers can dictate the contents of the science advice.

[1] "Early-career researcher" does not have a single consistent national or European definition. Young Academy Finland uses the term early-career researcher to refer to researchers with doctorates who are in the first 5–7 years following their dissertation defence.

According to the data gathered during the project, the most popular method of influencing for European young academies consists of traditional research synthesis and statements, but an increasing number of young academies also use reciprocal methods alongside the mere transfer of data (See Table 1). Understanding the context and timing of political decision-making as well as committing to a multilateral dialogue may also further the impact of the traditional syntheses in decision-making (Wyborn et al. 2018).

Examples of methods of interaction that support science literacy, understanding, and networking include programs that bring together decision-makers and researchers, such as the Young Academy of Scotland Pairing Scheme[2] or constructive discussion concepts such as Finnish TimeOut[3]. Table 1 contains examples of other forms of activity that can be applied to various contexts and easily scaled to support official advisory mechanisms. They can be used to establish channels between researchers and decision-makers, as well as between the wider civil society.

## 2 Support the inclusion of early-career researchers in the mechanisms of science advice

We often forget that what is framed as significant science and who are listened to as specialist or "whose knowledge matters" influences the political solutions that are considered possible (Jasanoff 1994; Turnhout et al. 2016). The mechanisms of science advice have been criticized for their excessive focus on natural sciences (Turnhout et al. 2016), but in addition to different disciplines, also the dif-

**Table 1.** Practices that support reciprocal action.

| Practice | Target group | Characteristics and objectives | Duration | Examples |
|---|---|---|---|---|
| Pairing schemes | Decision-makers, researchers | The organization responsible for the program connects a decision-maker with a researcher based on applications. The program creates trust and understanding between individuals and opens channels for thematic science advice. The programs often include learning through shadowing. | A few days consisting of visits and meetings, entire program 1–6 months | The examples collected during the project came from Scotland and Sweden. Similar programs can also be found in England (led by the Royal Society) and Finland (led by TUTKAS), for example. Based on the material collected during the project, such programs are being planned in Belgium and Estonia. |
| Regular, informal meetings | Decision-makers and administrators, researchers, wider audience | Intended for short informational briefings and questions in an informal and approachable package. The topics of discussion are decided by the researchers. Creates opportunities for cooperation, broadens the pool of the most apposite specialists, and highlights new issues for the agenda. | From 10–30 minutes to few days | The examples collected during the project included the Swedish "Fika med Forskare" meetings in the parliament and the camping trips for researchers and corporations organized in Latvia. |
| Dialogues | Decision-makers and administrators, researchers, wider audience | Suitable for situations where it is necessary to verify facts surrounding a single issue or phenomenon in a multidisciplinary manner, survey sources of information, or consider the questions. Avoid lectures and focus on discussions and understanding the issues. | 1–3 hours | Based on the material collected during the project, this approach is used in the Netherlands. In Finland, one example from other entities than young academies consists of the "Saumakohtia" dialogues of the Forum for Environmental Information. |
| Leadership training | Early-career researchers | Reinforcing the various skills of researchers and developing their competence; mentorship is also possible. | From 1–3 hours to few days | Plenty of examples around the world. Training for new members intended to develop their science advice capacity being developed by Global Young Academy was the only example raised in the collected material. |
| Fellowship or official exchange programs | Researchers, particularly early-career ones | Developing the researcher's policy understanding, diversifying the career paths of researchers in ministries, creating long-term relationships (also between institutions instead of just individuals). On the administrative side, the benefits include the opportunity to gain access to up-to-date research through the work of a researcher. | 1–12 months | No examples were raised in the project material. Known examples exist in the United States, for example. A similar pilot program proposition for Finland was developed in the project workshops. |
| Digital interaction platforms | Decision-makers and administrators, wider audience | Aimed at interaction at the grassroots level, which could increase trust and understanding through virtual face-to-face encounters free from location. Would enable faster science advice for municipalities, for example. | 1 hour | An idea developed in the project workshops. Based on the Meet A Researcher concept introduced to Finland by Young Academy Finland. |

[2] www.youngacademyofscotland.org.uk/our-work/smarter/msp-pairing/
[3] Timeout Foundation: www.eratauko.fi

ferent career stages should be taken into account. The voice of a younger generation of researchers may also be different from that of senior researchers (Spruijt et al. 2014, 22). The opinions gathered during our project also show that the skills required from researchers are very different to the ones required 20 years ago. Further, based on the collected materials, decision-makers might also sometimes see early-career researchers as more easily approachable than researchers who are more advanced in their careers.

However, scientific knowledge is still relayed to decision-makers by a select few. Thus, certain areas and individual universities may be overly represented (Helminen et al. 2020) – and sometimes even individual researchers. Early-career researchers may be left outside of the official science advice mechanisms (AAAS 2017) if only seniority and certain eminence are considered appropriate characteristics for science advisorship (Cooper 2016). The concentration of science advice to a limited group of researchers and certain type of researcher distorts and narrows the information available to decision-making.

Thus, researchers in different stages of their careers should be considered for appointments to official advisory panels as evidently as the different fields of research are. In the future, more attention must also be paid to rewarding social impact activities as part of the researchers' skills. Early-career researchers are most easily allowed a voice through informal, diverse, and interactive forms of activity. Young academies considered interactive forms of activity to be good methods for reinforcing both the policy understanding of the researchers and their science advice skills.

## 3 Transfer the responsibility for the performance of science advice from individuals to mechanisms

Science advice is easily personified. However, the credibility of scientific knowledge is built on the entire scientific community and its multivoiced nature. In addition to scientific credibility and legitimacy, science advice must also be relevant, i.e. meaningful, to the decision-making (Cash et al. 2003; Lenstch & Weingart 2011). Meeting these three requirements requires functional organizational planning, which contributes to ensuring the quality of science advice (Budtz-Pedersen 2016; Turnhout et al. 2016). All requirements are more easily met if, in addition to linear models of transfer of knowledge (Pielke 2007), interaction is also taken into account in the mechanisms of science advice (Figure 1).

In the science advice system, science and decision-making are partially intertwined (Gieryn 1983; Guston 2001), which introduces challenges to planning the interaction. Even when scientific knowledge is increased and scientific uncertainty is reduced, the ambiguity of the information coming from multiple sources may not be eliminated. Wicked problems, like any political decision-making, are always connected to conflicting values. In addition, decision-makers may utilize scientific knowledge selectively – the politization of science and the technocracy of politics are both common pitfalls (Jasanoff 1994; Pielke 2007). Hence, where decisions are made, it is essential to explain the data and sources on which the decisions are based in an open and transparent manner. Transparency also promotes the opportunities of the wider research community for peer reviewing the information used as the basis for decisions.

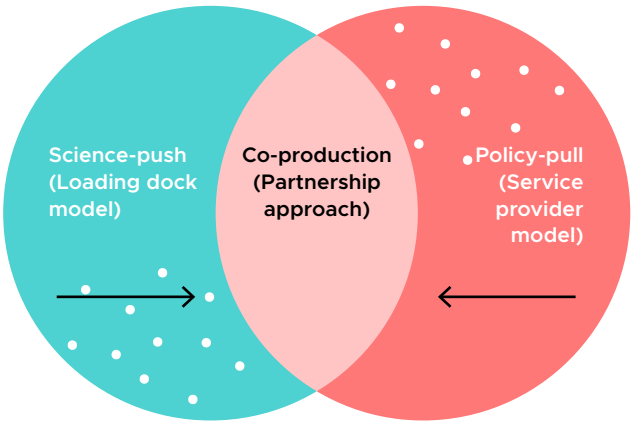


**Figure 1.** Three different models for illustrating the relationship between science and decision-making (Dunn, Bos, and Brown 2018, 144)

Following the recommendations of the report titled "Scientific Advice to European Policy in a Complex World" (2019, 9) by the High-Level Group of Scientific Advisors of the European Commission, Young Academy Finland proposes that preparations are launched for compiling national science advice instructions and best practices[4]. Young Academy Finland encourages the Federation of Finnish Learned Societies and Sofi, a joint venture of the four Finnish science academies, to begin discussions on the possibility of producing said instructions in extensive cooperation with the Committee for Public Information and the operators who are responsible for ethics in science and ethics in communication and publicity. Similar instructions have been produced previously, for example in Japan following the Fukushima crisis particularly to support the researcher's public capacity as an expert (Sato and Arimoto 2016).

Organizations and operators can also publish transparent criteria based on which the consulted experts are chosen. In searching suitable experts, a researcher's competence should be evaluated according to a diversity of indicators[5] , including track records of societal impact building.

Finnish science academies have already established strong ties to the science advice system of the European Union through Science Advice for Policy by European Academies SAPEA and European Academies Science Advisory Council EASAC. The materials collected during the project suggest, however, that the visibility of researchers in all stages of their careers in the European decision-making arenas should be increased further in the future. For example, young researchers' contacts toward the European Parliament were still considered to be limited and the decision-making system of the European Union unfamiliar.

## 4 Develop and diversify the funding opportunities for science advice mechanisms

The creation of a diverse science advice system based on more collective mechanisms requires varied funding. Instead of project-like activities, some science advice mechanisms should be anchored as permanent institutional cooperation solutions, to enable

[4] Also see the policy recommendation of the WISE project dated April 22, 2020 "Kuinka koronavirusepidemian kuluessa tehtävillä päätöksillä voidaan rakentaa kriisit kestävää Suomea?": wiseproject.fi/wise-hankkeen-politiikkasuositus/

[5] For example, see the national recommendations of the research community for responsible evaluation of researchers: avointiede.fi/en/news/national-recommendations-responsible-researcher-evaluation

constant dialogue between the researchers and decision-makers. A constant and varied dialogue would also reduce the time it takes to respond to the science advice needs in unexpected situations or future crisis.

According to the material collected during the project, the interactive activities of European young academies were often made possible only in close cooperation with other organizations, such as (senior) science academies and various intermediary organizations like governmental think thanks. Additionally, the limited resources of young academies could mostly be focused only on national activities and only few academies were able to operate on the EU level. Consequently, further investments should be made to more varied joint-European mechanisms in addition to national science advice channels.

The parties providing science advice (such as universities, boundary organizations, science academies), those facilitating it (e.g. research funding organizations), and those in need of the advice (the parliament, the government, political parties) must all invest for their part in multivoiced and transdisciplinary science advice. A genuine reciprocal dialogue between research and decision-making requires commitment and participation by the decision-makers as well (Perry & Atherton 2017).

## 5 Base the development of science advice as a practice and its mechanisms on relevant research on the relationship between science and policy

Plenty of quality research already exists on various models of reciprocal interaction between science and decision-making, such as information dissemination (e.g. Michaels 2009), boundary organizations (Guston 2001), or co-production of knowledge (e.g. Lemos & Morehouse 2005; Polk 2015; Miller & Wyborn 2018). The quality of the various science advice mechanisms is best ensured by drawing on the research in the area. The awareness of the weaknesses of linear interaction model, the science adviser roles of a researcher, and the opportunities provided by alternative models of interaction should also be increased. Researchers often become science advisers in organizational contexts where particular attention may not have been paid to strategic training or learning (Obermeister 2020). Thus, Young Academy Finland recommends supporting basic knowledge of the research area by, for example, including an introduction to science-policy interaction in degree programs alongside science communication. Science academies, for example, could provide various training programs based on relevant research to decision-makers and senior researchers.

## References


AAAS, The American Association for the Advancement of Science (2017): Connecting Scientists to Policy Around the World. Landscape Analysis of Mechanisms Around the World Engaging Scientists and Engineers in Policy. Executive Summary. AAAS. Retrieved from: www.aaas.org/sites/default/files/International-Landscape-Analyis-ExecSumm-02162017.pdf

Budtz-Pedersen, D. (2014): The Political Epistemology of Science-Based Policy-Making. *Social Science and Public Policy*, 51, 547-551. DOI: 10.1007/s12115-014-9820-z

Cash, D., Clark, W., Alcock, F., Dickson, N., Eckley, N., Guston, D., Jäger, J., Mitchell, R. (2003): Knowledge systems for sustainable development. *Proceedings of the National Academy of Sciences*, 100(14), 8086–8091. DOI: doi.org/10.1073/pnas.1231332100

Cooper, A. CG (2016): Exploring the scope of science advice: social sciences in the UK government. *Palgrave Communications*, 2(16044). DOI: 10.1057/palcomms.2016.44

European Commission's Group of Chief Scientific Advisors (2019): Scientific Advice to European Policy in a Complex World. Scientific Opinion No:7, September 2019. Publication Office of the European Union, Luxembourg. DOI: 10.2777/80320

Gieryn, T. F. (1983): Boundary Work and the Demarcation of Science from Non-Science: Strains and Interests in Professional Ideologies of Scientists. *American Sociological Review*, 48(6), 781–795.

Gustafsson, K. M., Berg, M., Lidskog, R. ja E. Löfmarck. (2019): Intersectional boundary work in socializing new experts. The case of IPBES. *Ecosystems and People*, 15(1), 181-191. DOI: 10.1080/1943815X.2018.1439509

Guston, D. H. (2001): Boundary Organizations in Environmental Policy and Science: An Introduction. *Science, Technology, and Human Values*, 26(4), 399–408.

Dunn, G., J. J. Bos ja R. R. Brown (2018): Mediating the science-policy interface: insights from the urban water sector in Melbourne, Australia. *Environmental Science and Policy*, 82, 143–150.

Helminen, M., S. Lundell ja A. Alvesalo-Kuusi (2020): *Tutkittu tieto kriminaalipoliittisissa lakihankkeissa*. Hankeraportti. Suomen Kulttuurirahasto. Retrieved from: skr.fi/serve/tutkittu-tieto-kriminaalipoliittisissa-lakihankkeissa

Jasanoff, S. (1994): *The Fifth Branch: Science Advisers as Policymakers*. Harvard University Press, Cambridge MA.

Lemos, M. C. ja Barbara J. Morehouse (2005): The co-production of science and policy in integrated climate assessments. *Global Environmental Change*, 15, 57–68.

Lentsch, J. ja P. Weingart (toim.) (2011): *The Politics of Scientific Advice: Institutional Design for Quality Assurance*. Cambridge University Press, Cambridge.

Michaels, S. (2009): Matching knowledge brokering strategies to environmental policy problems and settings. *Environmental Science Policy*, 12(7), 994–1101. DOI: 10.1016/j.envsci.2009.05.002

Miller, C. A. ja C. Wyborn (2018): Co-production in global sustainability: Histories and theories. *Environmental Science and Policy*. DOI: 10.1016/j.envsci.2018.01.016

Newman, J. ja B. W. Head (2017) Wicked tendencies in policy problems: rethinking the distinction between social and technical problems. *Policy and Society*, 36(3), 414–429. DOI: 10.1080/14494035.2017.1361635

Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy sciences*, 4(2), 155–169.

Obermeister, N. (2020): Tapping into science advisers' learning. *Palgrave Communications*, 6(74). DOI: 10.1057/s41599-020-0462-z

Perry, B. ja M Atherton (2017) Beyond critique: the value of co-production in realising just cities? *Local Environment*, 22(sup1), 36–51. DOI: 10.1080/13549839.2017.1297389

Pielke Jr, R. A. (2007). *The honest broker: making sense of science in policy and politics*. Cambridge University Press.

Polk, M. (2015): Transdisciplinary co-production: designing and testing a transdisciplinary research framework for societal problem solving. *Futures*, 65, 110–122. DOI: 10.1016/j.futures.2014.11.001

SAPEA, Science Advice for Policy by European Academies (2019): *Making Sense of Science for Policy Under Conditions of Complexity and Uncertainty*. Berlin, SAPEA. DOI: 10.26356/MASOS

Sato, Y. ja T. Arimoto (2016): Five years after Fukushima: Scientific advice in Japan. *Palgrave Communications*, 2(16025). DOI: 10.1057/palcomms.2016.25

Spruijt, P., Knol, A. B., Vasileiadou, E., Devilee, J., Lebret, E. ja C. A. Petersen (2014): Roles of scientists as policy advisers on complex issues: A literature review. *Environmental Science & Policy*, 40, 16–25. DOI: 10.1016/j.envsci.2014.03.002

Turnhout, E., A. Dewulf ja M. Hulme (2016): What does policy-relevant global environmental knowledge do? The cases of climate and biodiversity. *Current Opinion in Environmental Sustainability*, 18, 65–72. DOI: 10.1016/j.cosust.2015.09.004

Wyborn, C., Louder, E., Harrison, J., Montambault, J., Montana, J., Ryan, M., Bednarek, A., Nesshöver, C., Pullin, A., Reed, M., Dellecker, E., Kramer, J., Boyd, J., Dellecker, A. ja J. Hutton (2018): Understanding the Impacts of Research Synthesis. *Environmental Science & Policy*, 86, 72–84. DOI: 10.1016/j.envsci.2018.04.013