Aalborg Universitet

The Danish Eco-System of Science for Policy

Discussion Paper

Pedersen, David Budtz; Hvidtfeldt, Rolf

Publication date:
2021

Document Version
Publisher's PDF, also known as Version of record

Link to publication from Aalborg University

Citation for published version (APA):
Pedersen, D. B., & Hvidtfeldt, R. (2021). *The Danish Eco-System of Science for Policy: Discussion Paper*. Uddannelses- og Forskningsministeriet | Danmarks Forsknings- og Innovationspolitiske Råd . https://ufm.dk/forskning-og-innovation/rad-og-udvalg/danmarks-forsknings-og-innovationspolitiske-rad/aktuelt/arrangementer/1005458dfirdebatoplgFINALa.pdf

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

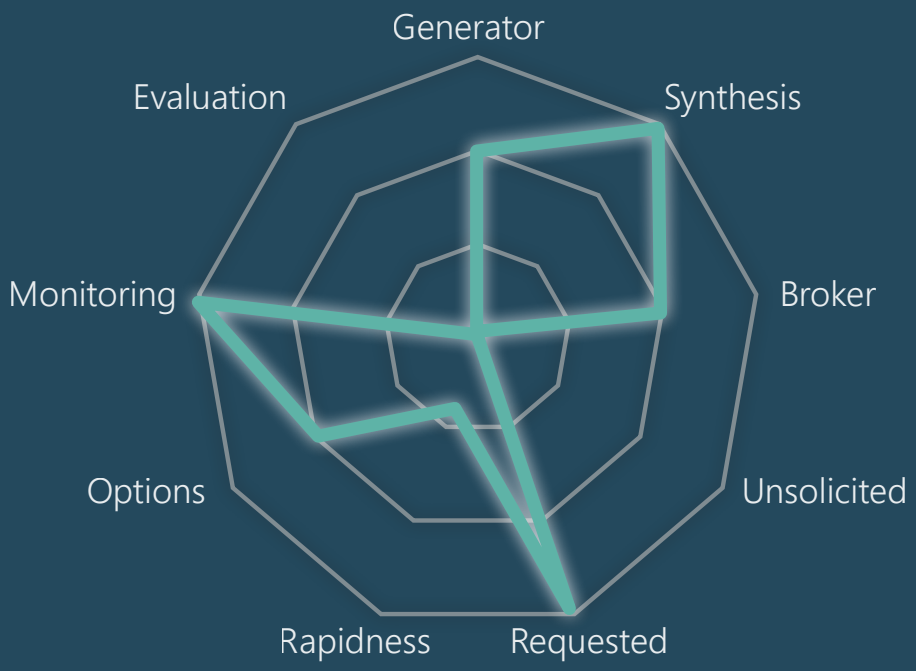
Take down policy
If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from vbn.aau.dk on: July 04, 2025

The Danish Eco-System of Science for Policy

Discussion Paper

David Budtz Pedersen & Rolf Hvidtfeldt



dfir
DANISH COUNCIL FOR RESEARCH AND INNOVATION POLICY

Kolofon

This publication can be downloaded from the Danish Council for Research and Innovation Policy www.ufm.dk/dfir
It can also be obtained from the lead author Prof. David Budtz Pedersen, e-mail davidp@hum.aau.dk

The views expressed in this document reflect the assessment of the authors and may not in any circumstances be regarded as stating an official position of The Danish Council for Research and Innovation Policy.

Published by The Danish Council for Research and Innovation Policy
April 2021
Ministry of Higher Education and Science
Børsgade 4
1215 Copenhagen K.
Denmark

Design: Rosendahls a/s
ISBN: 978-87- 93807-44-0
The Danish Eco-System of Science for Policy – Discussion Paper - web, UK

Contents

Preface

The clear communication and adaptation of scientific evidence and advice is a fundamental resource for policymaking in contemporary societies. It is critically important for scientists and policymakers to work together to develop and implement policies that have the greatest likelihood of success in responding to policy problems and emergencies, such as the Covid-19 pandemic, climate change, biosecurity and resource management.

This report discusses the provision of research-based evidence for policymaking in Denmark. It provides for the first time an overview of the most important roles and responsibilities that make up the Danish eco-system of science for policy.

The report has been commissioned by The Danish Council for Research and Innovation Policy (DFiR) as part of an on-going effort to review and improve the use of research-based evidence in Danish policymaking. DFiR invited the authors to draft a discussion paper that presents an overview of the eco-system of scientific advice in Denmark as well as challenges and items for future consideration.

The report finds that Denmark has a very rich supply mechanism of science for policy. However, most institutions and structures are sectoral, reflecting the institutional divisions of the Danish central administration. This situation leaves considerable space for improvement of coordination, co-creation, co-creation and peer learning across scientific silos and policy areas in the future.

It is our hope that this report will inspire the conversation on how scientific advice can inform policymaking, and how scientific experts and policymakers can work together to enhance the public value and impact of research.

Frede Blaabjerg,
Chairman of DFiR

David Budtz Pedersen
Professor, lead author

Introduction

The purpose of this discussion paper is to provide an overview of mechanisms and practices of science advice in Denmark. The report is based on a mapping of existing structures and institutions, and aims at providing a brief, unified overview of science advisory practices in Denmark. Besides formal structures, the discussion paper presents a number of exemplary cases of innovative science for policy practices, such as the Danish Covid-19 Reference Group and initiatives to support knowledge translation and knowledge exchange for policymaking. The paper does not present an exhaustive list of initiatives but is based upon a selection of representative examples of structures and institutions in Denmark. The second part of the paper consists of a discussion of challenges and opportunities for science advice in Denmark, including a discussion of emergency response, cross-disciplinary advice, and evaluation and assessment of policy-oriented research activities.

The Danish science for policy eco-system consists of a multitude of actors, procedures, norms, practices, and structures. It extends across most, if not all, policy areas, including health, food, energy, agriculture, environment, foreign policy etc. In some cases, science for policy units operate in close proximity to the policymaking system they are designed to support. In other cases, research advice is commissioned to provide external, independent evidence with less direct pathways to policymaking. In Denmark, there exists no unified framework for translating science into policy, such as a Chief Science Adviser or Scientific Advice Mechanism. And there is no central organising unit within government or parliament responsible for orchestrating cross-sectoral science advice. This creates a number of "eco-systems within the eco-system" with several overlapping competences across different governance levels.

While competences and structures of science for policy are closely related to individual policy areas, this situation also leaves open a number of questions: are there sufficient peer learning activities among experts involved in science for policy across sectors; how can government bodies coordinate science advice when responding to rapid cross-cutting crises; how can policymakers access scientific advice and evidence outside their policy domain; and how can challenges such as transparency, responsibility, accountability and diversity be addressed across the eco-system? These are some of the challenges outlined in this paper. But before discussing these challenges in more detail it is first necessary to take a closer look at the configuration of the Danish eco-system.

A note on terminology: this discussion paper is occupied with the use of scientific evidence and advice in policymaking ('science for policy') and not with determining budgets or structures for the research and innovation eco-system ('policy for science'). The lines between these two can easily become blurred, not least because areas of 'science for policy' have implications for research priorities, incentives and funding mechanisms that support scientific advice. For the purpose of clarity, however, it is useful to keep the two roles distinct. While sometimes the same individuals are involved in providing advice on 'policy for science' and 'science for policy,' the nature of national science funding systems is outside the scope of this discussion paper, beyond observing how it might influence the production of knowledge for policy.[1]

This report has been commissioned by The Danish Council for Research and Innovation Policy (DFiR) as part of an on-going effort to review and improve the use of research-based evidence in Danish policymaking. The report was presented at a seminar jointly organised by the European Commission's Joint

1 In this paper, the terms 'science', 'evidence' and 'research' are used interchangeably. Each of these terms can be contested, but here they are used as a shorthand to mean knowledge derived from research that employs internationally recognised and commonly held standards of scholarship in its methods and integrity. Also, it should be noted that the term 'science' is used to include disciplines across the physical, natural, social and human sciences.

Research Centre and DFiR on 22nd April 2021 (hosted online). Material presented and discussed in this paper is based on desk research, method mapping, and interview sessions with leading representatives of the Danish eco-system of science for policy.

Advisory functions

For the purpose of this report, the above list of competences has been mapped onto the profile of the reviewed instruments. In each of the following sections a radar chart shows the overall profile of the instrument or institution.

Knowledge generator	Producing original scientific knowledge at the highest international level
Knowledge synthethis	Producing reviews and integrated assessments of scientific knowledge and best practices
Knowledge broker	Translating, mobilising and communicating research and evidence to policy-makers and practitioners
Unsolicited input	Providing advice to policymakers on the initiative of the mechanism, e.g., if new important research is identified
Requested input	Responding to specific requests from policymakers, e.g., risk assessment, technical reports, etc.
Rapidness	Acting rapidly in emergency situations where consequences are unknown, and uncertainties prevail
Identify options	Pointing to potential actions and their consequences, balancing scenarios and desired outcomes
Monitoring	Technical monitoring of specific policy areas, and collecting data on effects (and effectiveness) of regulation
Evaluation	Analysis and appraisal of policies and regulations, and evaluation of advisory services and functions

Part 1
Science for policy in Denmark

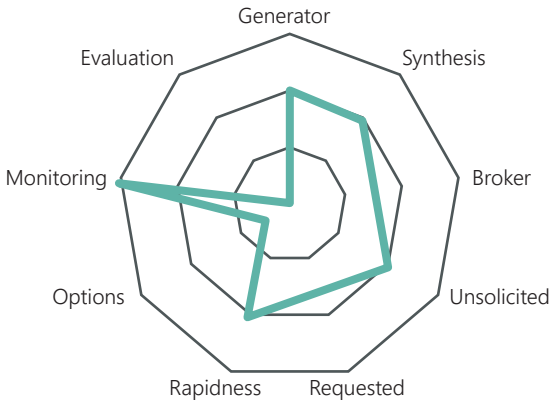
1.1 Self-governing research institutions

The science for policy eco-system in Denmark consists of several mechanisms for generating and synthesising scientific knowledge (universities, government research institutions)[2] coupled with a number of independent public research institutes and advisory panels and expert groups.[3] While these research and advisory institutions work independently, they have different relationships to government.

For example, The Geological Survey of Denmark and Greenland (GEUS) is an internationally oriented, independent research and advisory institution within the Danish Ministry of Climate, Energy and Utilities. GEUS carries out activities to exploit and protect geological resources in Denmark by, e.g., compilation and storage of data, research monitoring, and consultancy within water, energy, minerals, fisheries, climate adaptation, and national security. As an independent research unit within government, GEUS provides analyses, advice and reports commissioned by the government. Whereas its advisory services are commissioned under departmental instruction, research and development activities within the institute are independent. Besides the Danish Ministry of Climate, Energy and Utilities, GEUS provides advise to the Prime Minister's Office, the Danish Ministry of Foreign Affairs, the Government of Greenland, and the Danish Parliament. Funding for GEUS is secured by a special grant at the Annual National Budget (§76) in addition to smaller-scale consultancy grants. Science advice provided by GEUS is distributed through a number of formats, such as technical reports, statements, policy briefings, background documentation, and testimonials to government hearings, panels, taskforces, and meetings.

Another example is The Danish Institute for Human Rights, which is an independent state-funded research and advisory institution. The institute provides advice to government, parliament, ministries and public authorities on human rights, for instance, when new legislation is suggested and introduced. Within the institute, the research department enables science for policy that supports the development of stronger and more coherent human rights systems across Danish and international government agencies, justice systems, police forces, civil society organisations, companies, universities etc. Knowledge exchange and communication of science to policymakers are crucial parameters for the institute.

A third example is The Royal Danish Defence College, which is an independent agency under the Armed Forces. The College provides training, research, science advice and consultancy services in core military areas. Much of the research is done in collaboration with other public research institutions and universities. The College works both as an internal provider of advice and analyses to the government, and at the same time publishes reports and expert statements accessible to a wider audience of stakeholders and peers.

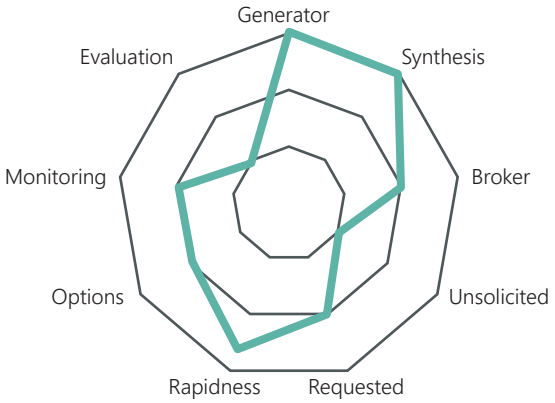


2 Det Nationale Forskningscenter for Arbejdsmiljø (NFA), Statens Serum Institut (SSI).

3 Danmarks Statistik (DST), Det Nationale Forsknings- og analysecenter for Velfærd (VIVE), Institut for Menneskerettigheder, De Nationale Geologiske Undersøgelser for Danmark og Grønland (GEUS), Danmarks Meteorologiske Institut (DMI), Dansk Institut for Internationale Studier (DIIS), Forsvarsakademiet, Danmarks Evalueringsinstitut (EVA) etc.

1.2 Government research institutions

Danish government research institutes are state-owned, self-governing research institutions under government ministries whose primary task is to provide scientific advice within specific areas. According to statutory order 581 of June 01, 2014, a government research institution should conduct research to the highest international level with the aim of (1) advising policymakers within the institution's core areas, (2) produce evidence and reports for government agencies, (3) disseminate research and technology to relevant public and private stakeholders, and (4) perform operational tasks in connection with the core areas of responsibility.



Currently, there exist two Danish government research institutions: The National Research Centre for the Working Environment (NFA) under the auspices of the Danish Ministry of Employment, and The Danish Serum Institute (SSI) under the auspices of the Danish Ministry of Health.

NFA provides science for policy services within the institute's core areas, e.g., psycho-social working environment, safety culture, work-related accidents, chemical hazards, toxicology and occupational epidemiology. The institute provides evidence, research and advice to the ministry and related agencies. In addition, the institute provides evidence-informed advice to other authorities, social partners, safety consultants, companies, and partners engaged in realising the national working environment strategy. NFA's research, monitoring programs, and knowledge mobilisation units are important factors for knowledge accumulation of the working environment and for providing evidence and advice to working environment regulation.

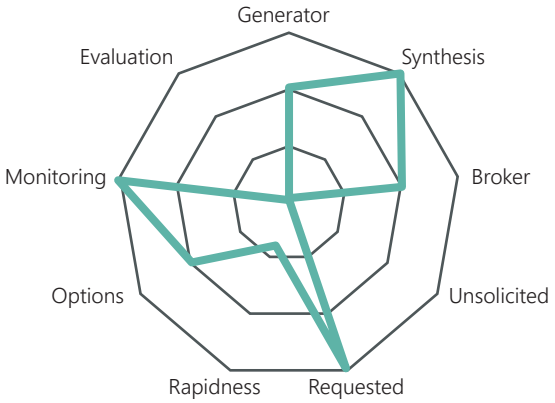
SSI's main task is to ensure preparedness against infectious diseases and biological threats as well as inform policymakers about biological risks, emergency response and vaccine supply. SSI provides science for policy services within areas such as disease surveillance, specialised diagnostics, pandemic preparedness, biobanks and childhood vaccination. Data and knowledge are communicated and presented to policymakers and published in scientific journals. Each year, SSI's researchers publish approximately 400 scientific articles. SSI provides counselling to the Danish healthcare system and government-wide authorities in the event of, e.g., epidemics. The SSI is a central partner and provider of science for policy in the Danish government's taskforce for Covid-19.

1.3 Government commissioned research advice

In addition to self-governing institutions, several mechanisms are in place to provide science for policy in Denmark. Chief among these are contracts for government commissioned research at universities ('forskningsbaseret myndighedsbetjening'). The provision of commissioned research at universities has become a prevalent mechanism of science for policy in Denmark since the merger of universities with Danish government research institutions first in 2004 and later in 2007.

Before 2004, government research advise was primarily placed at government research institutions (e.g., 31 institutions in 1997). In 2007, most of these institutes had been merged with universities. Technical University of Denmark was merged with Research Center Risø, Danish Food Research, Danish Fisheries Research, Danish Space Center and Danish Transport Research. University of Copenhagen was merged with The Royal Veterinary and Agricultural University and The Danish University of Pharmaceutical Sciences. Aarhus University was merged with the Danish Environmental Research Institute, the Danish Agricultural Research Institute, the Aarhus School of Business and the Danish University of Education. Department of Build Environment became part of Aalborg University, while The National Institute of Public Health has become part of University of Southern Denmark.

Whereas government science advice was formerly placed at government research institutions, it is today organised through contracts ('framework agreements') between ministries and universities, in which specific tasks, deliverables and performance targets are determined. Consequently, government commissioned research at universities are no longer permanent structures but fixed-term contracts with annual goals and requirements. As such, these contracts are subject to competition among universities. Ministries call for applications and invite different universities to apply for research contracts. At the university-level the provision of commissioned research advice is partly enabled by researchers and advisers who merged into the universities in 2007; partly by synergies with existing research groups, infrastructures and facilities. Special courses for capacity-building within knowledge transfer, science advice and knowledge brokerage are regularly offered to research scientists specialising in commissioned research, and specialist staff who support the translation and implementation of reserach (e.g., at Technical University Denmark). Typically, framework agreements between universities and ministries are designed to facilitate the provision of technical science advice, monitoring tasks, data collection and analysis of risks and regulatory compliance, e.g., in fisheries, agriculture, food, veterinary disease control, foresting, biodiversity etc. [4]



One example is the current framework agreement between Ministry for Food, Agriculture and Fisheries (MFAF) and The University of Copenhagen. The agreement spans four years (2020-2023) during which the university receives approx. 120 mill DKK a year to provide expertise, monitoring and reports on resource management, foresting and veterinary systems and economic data related to agriculture and fisheries. The framework agreement stipulates tasks, targets and deliverables, which ensures the production and dissemination of research and evidence in support of MFAF's administrative tasks and operations. In addition, the framework agreement requires that adequate knowledge and skills are in place to deliver research-based support to policymaking within the disciplines covered by the contract. Research advice under the agreement is expected to relate to fixed tasks as well as ad hoc orders, e.g., urgent orders for legislative preparatory work, reports and evaluations. At the same time, the framework agreement includes capacity-building and maintenance of (1) research-based emergency preparedness, including reference laboratory activities, (2) professional and technical readiness for rapid and efficient resolution of emerging and current situations, (3) surveillance and monitoring, including specific data monitoring services, (4) national and international data reporting tasks as well as operation, maintenance and data production, (5) and general research- and competence-development within MFAF's focus areas.

Other examples of government commissioned research at universities include the framework agreement between the Ministry of Environment and Food

4 At the time of writing, there are seven framework agreements in operation stipulating various research, advisory, and monitoring services performed by universities at the request of Danish ministerial departments.

and Aarhus University. The agreement spans four years (2020-2023) during which the university receives approx. 350 mill DKK each year to provide science for policy within food, agriculture, environment and energy. The Danish Centre for Food and Agriculture (DCA) and Danish Centre for Environment and Energy (DCE) at Aarhus University are responsible for coordinating the science-based policy advice, providing approx. 350 specific items of advice annually.

Science advice provided by DCA and DCE is distributed through several formats, such as technical reports, syntheses, policy briefings, background documentation and testimonials to government agencies and Parliament.

Besides, framework agreements between ministries and universities, in which longer-term tasks and deliverables are determined, ministries also commission small-scale consultancy and advisory services at universities ('forskningsbaseret rådgivning'), either as add-ons to framework agreements or as stand-alone agreements. As part of such income-generating activities, universities may provide monitoring services, analyses, expert statements, submissions and other forms of input at the request of public authorities. Since there exist no comprehensive inventory of commissioned research at Danish universities, it is not possible to estimate the extent to which such contracts are used within the scope of this paper.

1.4 Commissions and councils

Policy advisory committees and commissions are regularly used in Denmark to inform policymakers about evidence, expertise and science. Advisory committees link the realms of public policymaking, science and sometimes civil society by including academics, government representatives and societal stakeholders to address specific government challenges. Most commissions are tasked to provide technical knowledge and guidance to support the public acceptance and legitimacy of larger policy reforms, e.g., quality of public sector performance, crime prevention, taxation programmes, climate mitigation etc. In these organisational settings, the provision of science for policy is often limited to the declaratory statement ('terms of reference') of the commission or committee. Other commissions used in Denmark are commissions of inquiry, which may be enacted in circumstances where opposition parties or government itself needs to investigate controversial policies, such as the Iraq and Afghanistan Commission (on the Danish warfare interventions), the Intelligence Service Commission (on Danish surveillance programmes and monitoring of political parties) etc. These commissions of inquiry are typically not inhabited by members of the scientific community with some exceptions.

Commissions often are entangled in complex processes of policymaking, implementation and evaluation. As advisory committees, they provide advice based on evidence, reconciling interests, and informed deliberation. They have the potential to support governments in making decisions that are both well-founded and publicly acceptable, or even to democratise policymaking via participation of civil society organisations. The role of scientific advice in advisory committees however are influenced by a number of mechanisms and conditions.

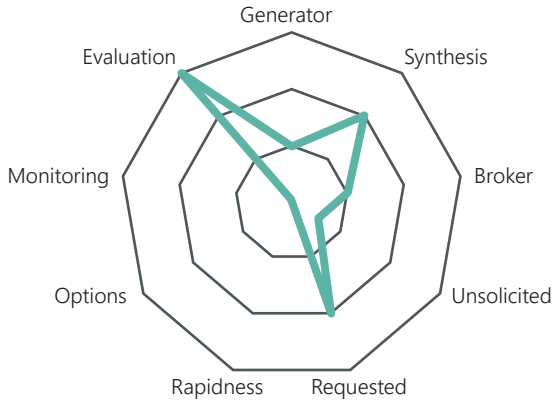
Advisory committees are generally restricted in their scope and mandate, and hence cannot provide non-commissioned scientific advice or acquire further, multi-disciplinary testimonials from experts outside the committees (with exceptions). Advisory committees in Denmark have traditionally functioned as a corporatist arena for interest mediation where stakeholders seek to reach a consensus on pressing policy concerns. However, advisory committees and commissions increasingly involve both inside policy professionals and scientific experts that contribute to legitimise decisions with reference to social and scientific knowledge – especially in areas of economics, law, climate science, national security, crime prevention etc. This is often described as

an epistemic drift towards the professionalisation and academisation of policy advice (Craft & Howlett 2013).[5]

Examples of permanent advisory councils include the Danish Economic Councils, The Danish Council on Climate Change, The Danish Council on Ethics and more than 10 other councils within specific policy area, such as education, urban planning, integration, trade and investment, and protection of vulnerable groups etc. The following sections describe key components of councils that are predominantly tasked to provide science for policy.

The Danish Economic Council is an independent economic advisory body. The primary aim of the council is to provide independent analysis and policy advice to Danish policymakers. The institution consists of a Board of Chairs together with two immanent council structures: The Economic Council and The Environmental Economic Council. The Board of Chairs consists of four university professors in economics. The board is independent and responsible for the analyses and conclusions provided in the three main reports presented to the councils and to government. Members of the Board of Chairs are appointed by the Minister of Finance for a three-year period (which can be extended). Members of the councils represent different institutions (unions, employer organisations, government policymakers etc.). These members are nominated by the respective institutions and organisations and appointed by the government. The chairs have no formalised role in relation to economic policy but aim at providing policymakers with the most scientifically well-founded basis for decision-making. By providing thorough economic analysis and policy relevant assessments, the Board of Chairs contributes to the Danish public debate on economic policy issues. The Chairs and the councils are supported by an independent secretariat.

The Danish Council on Climate Change provides recommendations on climate initiatives in the transition to a low-carbon society based on independent professional analyses centred on the overall objective for 2050. Among other things, the council provides suggestions for cost-effective climate policy solutions, paving the reducing greenhouse gas emissions while simultaneously maintaining welfare and development. The council contributes with professional recommendations based on independent analyses and input from the council members. The Danish Council on Climate Change was established as a result of the Climate Change Act, which outlined the Council's tasks. In the Climate Change Act, it is stated that the council must (1) evaluate the implementation of national climate objectives and international climate commitments, (2) identify measures to achieve greenhouse gas reductions, (3) formulate recommendations to shape climate policy, including a selection of potential mechanisms and transition scenarios and (4) contribute to the public debate and engage stakeholders across industry, government, labour market and civil society. The council consists of six members together with a chairman who are appointed for a four-year term by the minister of climate and energy.[6] The institution primarily disseminates science for policy advice by publishing annual and biannual reports, status outlooks, evidence reports and by presenting results to government policymakers and third parties at meetings, conferences and in the media.



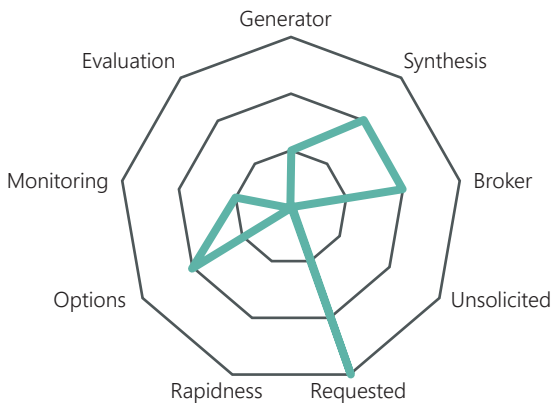
5 A special thanks is dedicated to research associate Jonas Følsgaard Grønvad, Aalborg University for providing contributions to this section.

6 Act No. 716 of 06.25.2014 "Act on The Danish Council on Climate Change, climate policy statement and setting national climate goals." Section 1 of the Climate Change Act states: "The act has as its main goal the establishment of an overall strategic framework for Denmark's national climate policy for the purpose of progressing to a low-carbon society by 2050, that is to say a resource-efficient society with an energy supply based on renewable energy with markedly lower greenhouse gas emissions from other sectors which at the same time supports growth and development. The law must also contribute to transparency and publicity about the status, direction and momentum of Denmark's climate policy." (Translation by the Danish Council on Climate Change).

The Danish Council on Ethics advises and stimulates public debate on biotechnology, which affect human life, nature, the environment, and food production. In addition, the council works to address ethical issues related to healthcare in general and to the public healthcare sector specifically. This is accomplished by producing reports and statements etc. in specified areas and by mounting debate generating activities in the form of, e.g., public enquiries and debate days, publishing of debate books, anthologies, videos and teaching material, and extensive lecturing activities. In addition, the council gives a run-down of its activities every year in an annual report. The council began its work on 1 January 1988. The "Act on the Establishment of an Ethical Council" directs the council to partly submit reports concerning specific topics fixed by law and partly take up tasks on its own initiative. The purpose of the act is to ensure that advice and information concerning ethical problems arising from developments in the healthcare sector and the biomedical field are continuously submitted to the Danish Parliament, public authorities and the public at large. The governance structure of the council includes a Danish parliamentary committee on The Council of Ethics for the purpose of safeguarding the close relations between the Danish Parliament and The Council of Ethics. The parliamentary committee appoints a certain number of the council's members. Furthermore, the parliamentary committee follows the work of the Council and may call on it to take up certain topics within its terms of reference. The Minister of Health asserts no instructional influence towards The Danish Council of Ethics and likewise the minister has no obligation to follow the recommendations of the council.

1.5 Scientific councils

The Danish Council for Research and Innovation Policy (DFiR) was established on 1 April 2014. The council is charged with the responsibility to provide policy-makers with independent expert advice on science, technological development and innovation. The council provides policy advice to the Minister for Higher Education and Science and can be asked to provide input or statements to other government agencies. The Danish Council for Research and Innovation Policy publishes an annual report, which compiles projects and activities during the previous year. DFiR's work and advice are based on three guiding principles: (1) A holistic approach, (2) an international approach and (3) an evidence-based approach. The basis on which the Council gives its recommendations must be transparent, and the recommendations are based on analyses, data or evaluations. The council is free to take up subjects and projects on its own initiative. At the same time, ministers, the government, or the Parliament are able to request advice from the council within science, technology and innovation policy.



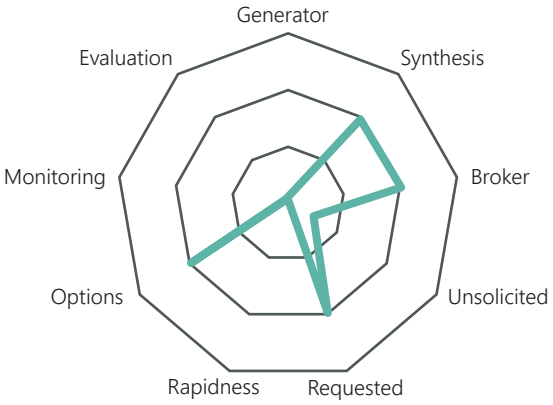
The Independent Research Fund Denmark (DFF) is a government research funding agency under the Ministry for Higher Education and Science. Besides funding independent research, the Fund provides research advisory services to the Danish Parliament, the Minister for Science, Innovation and Higher Education and other authorities. According to public records, DFF provides research advice in approx. 300 cases each year. Requests for advisory services are addressed to DFF's Board of Directors, which coordinates with the relevant scientific councils. Among other things, DFF's advisory services include quality assurance of peer review, grant evaluation for other research funding

bodies and advice on establishing procedures for assessment of applications and appointment of experts. Advisory services such as these draw on the wide-ranging expertise of members of DFF and its associated research councils. In principle, the Board of Directors can be asked to provide expert statements on other science- and technology-related policy issues or societal challenges but there exist no official records of such advisory exercises. According to "Act 384 on The Independent Research Fund Denmark", DFF may also provide advice on its own initiative (§16, 2), but there is no account of the extent of such activities in public material collected for this report.

Both DFiR and DFF mixes 'science for policy' (government science advice) with 'policy for science' (research priorities, incentives and funding mechanisms). The two institutions can be asked to provide expert opinions, statements and reports concerning the quality and functioning of the research and innovation ecosystem, e.g., to support the introduction or evaluation of science and innovation policies. At the same time, the two institutions can be requested to provide advice to other public authorities and deliver input and advice on relevant science- and technology-intensive policy areas. While funding agencies such as the Danish National Research Foundation and Innovation Fund Denmark are not included in this mapping, it is likely that those institutions are also occasionally requested to provide input and opinions to the Minister for Higher Education and Science and related government agencies.

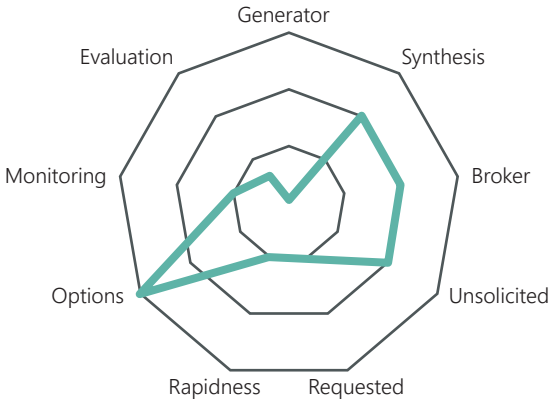
1.6 Permanent expert panels

Besides the examples of ad hoc expert panels provided in the next section, Danish governments have set up a number of permanent expert panels that oversee implementation and quality assurance within specific policy domains, e.g., clinical guidelines, environmental protection, and national research evaluation etc. For example, the advisory committee for national clinical guidelines is a permanent expert group established to advise the Danish Health Authority in preparing National Clinical Guidelines (NKR). NKR are professional standards targeted at specific clinical situations. The guidelines are used to support decision-making by healthcare professionals as part of diagnosis, treatment, rehabilitation etc. The guidelines bring the latest research and knowledge to healthcare professionals to support a consistent and evidence-based treatment for the benefit of patients. The advisory committee is consulted prior to the publication of individual guidelines. The committee may, on its own initiative, address other issues concerning clinical guidelines. The NKR Advisory Committee is headed by a representative from the Danish Health Authority, which is a government agency under the auspices of The Danish Ministry of Health. There are seven members appointed by Danish Regions and Local Government Denmark, one member appointed by the Danish Ministry of Health, five members appointed by different health science disciplines (medicine, nursing and physiotherapy) and one member appointed by the interest group Danish Patients.



1.7 Research and Technology Organisations

Another source of expert advice in Denmark is drawn from the seven RTOs Institutes, which cover a wide range of scientific and technological fields, including robot technology, food and agriculture, biomedicine and security.[7] The RTOs Institutes are self-owned, impartial, and independent of business or political interests. Their main task is to provide technological knowhow and expertise to private businesses to increase the uptake of new knowledge and technologies. In addition, the RTOs Institutes work to address a broad range of challenges for public sector institutions and Danish authorities, including advisory services on environmental adaptation and climate change. In this respect, the RTOs Institutes act as a hub for knowledge mobilisation and implementation research in relation to specific governmental tasks. They are named *approved* technological service institutes because they are approved by the Minister of Higher Education and Science. For an organisation to be RTOs certified, it must have documented competences in technology transfer and implementation of research of importance to Danish businesses and maintain a high professional standard. In 2019, the RTOs Institutes had 3629 employees. Besides commercial R&D, the RTOs Institutes provides consultancy services, testing and calibration of new technologies as well as education, training and courses for the public and private sector.



1.8 Ad hoc mechanisms for science for policy

The following sections describe some key components of the informal science for policy eco-system in Denmark. The particular configuration of ad hoc advisory mechanisms varies across policy areas and fields of expertise. The analysis shows how different institutional arrangements are available to knowledge providers and policymakers to interact outside the formal system of science for policy described above. Ad hoc mechanisms for evidence-informed advice can be organised to respond to rapid policy problems or serve as a platform for advisers and experts to translate and mobilise research on their own initiative. Furthermore, they involve a broad range of activities, knowledge generation, synthesis, translation, transfer, absorption, communication and integration into policymaking.

7 In Danish, RTOs are called "Godkendt Teknologisk Service" (Approved Technological Service) the abbreviation of which is GTS.

1.9 Interim panels, working groups and taskforces

Some structures, such as government research institutions or government commissioned research advice, are better suited to provide formal advice against a longer time horizon, typically by initiating new research and producing detailed reports. Others, such as interim expert panels, working groups, and taskforces, may provide more rapid, informal advice, by gathering inputs from a range of sources or responding to specific policy questions. In some instances, ad hoc working groups may be appointed by a minister to support policymakers in different thematic areas and provide technical guidance or expert advice to government or parliament. Ad hoc working groups in Denmark are often organised as a blend of different professionals and stakeholders, and may integrate industrial leaders, scientific experts, civil society representatives, unions, and policymakers. Together, they formulate action plans, guidelines or recommendations for public policymaking at the national, regional and local level. Ad hoc committees have limited tasks and their aims and goals are more or less narrowly defined (often stated in 'terms of reference'). The Danish public administration uses expert groups and panels *extensively* to test new policies and source ideas and advice (FM 2019, Lund 2019). Recommendations and conclusions from working groups or taskforces may be embedded in policymaking or may, in some instances, be discarded due to lack of feasibility or changes in the political landscape – such as the incoming of new governments or ministers. There exists no authoritative list of all working groups or taskforces in operation in Denmark.

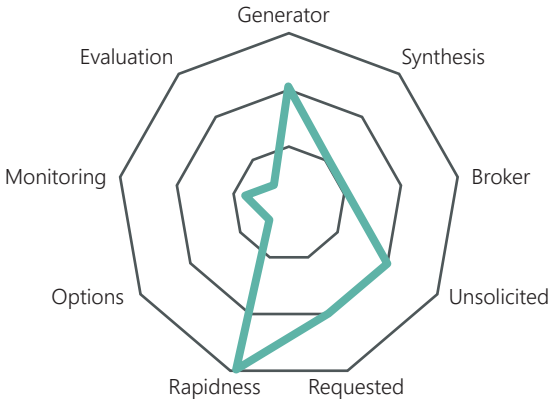
One example is the extensive use of legislative preparation committees ('lovforberedende udvalg'), which often includes external members with research capacity in the relevant policy area. In Denmark, legislation may be prepared either internally by policymakers in the relevant ministries (who are free to consult experts in the process of drafting new regulation), or by setting up legislative preparatory committees (working more like a commission or council) composed of internal and external members. The use of legislative preparation committees ensures that the affected authorities and organisations are consulted, and that "relevant external expertise" is available (Danish Ministry of Justice 2018). Legislative preparatory committees are set up in cases of complex legislative work or legislation of principled nature. The use of legislative preparation committees in Denmark ensures the participation of necessary and relevant expertise and that the interests of relevant authorities and organisations are represented.

Another example is the Advisory Committee for Educational Goals ('Rådgivningsgruppen for Fælles Mål') under the auspices of the Ministry of Children and Education. In 2014, a comprehensive reform of the elementary school system in Denmark introduced a number of mandatory 'goals' intended to set the direction for teaching. In May 2017, however, it was decided to give schools greater professional autonomy to organise the teaching. The political agreement resulted in a change of the regulation, which meant that 3.170 existing skills and knowledge goals were made indicative rather than mandatory. On this basis, the Minister appointed an advisory committee (involving educational researchers, teachers, and representatives of relevant organisations) to advise the Ministry on how the changes could best be implemented. The task of the committee was to advise on how to put regulatory changes already agreed upon into practice. The advisory group was explicitly instructed not to discuss revisions of existing goals but advise on how to implement the changes. Further, the advisory committee should provide input to a planned revision of curricula, teaching guidelines and templates for teaching courses. The advisory committee was dismantled after the mandate terminated in 2018.

1.10 Individual advisers

In Denmark, there is no Chief Scientific Adviser to the government, and the government do not appoint permanent scientific advisers with specific technical or scientific expertise (besides chairs and members of permanent councils and panels, see section 1.5). Science for policy is mainly adopted from internal science services and external councils, commissions, committees and research units. Yet, individual academics and experts are regularly asked to provide personal advice to policymakers. All government departments request advice from individual experts independently from the formal mechanisms of science advice described in earlier sections. In many cases, government agencies, parliamentary committees as well as regional and local authorities call upon individual scientists and academics to provide input on policy issues and challenges – for instance by convening seminars, workshops or informal meetings where researchers can discuss professional perspectives – sometimes openly, sometimes bound by confidentiality.

Danish policymakers make extensive use of consultants, advisers and specialists, who provide day-to-day input on relevant topics. In most cases, the roles and responsibilities of individual experts are not clearly



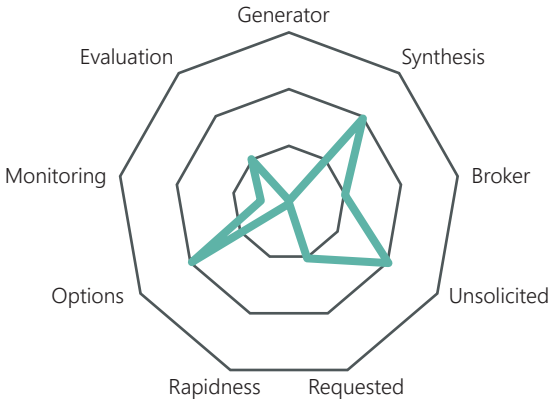
defined. And it can be hard for outsiders to assess the authority of external advisers within the scientific community. The role of these individuals needs to be understood within the wider eco-system of expert advice, which also include consultation with the civil service, external advisory bodies, policy influencers, NGOs, civil society organisations and others. Individual scientists, such as those that chair advisory committees, are often used in their personal capacity to perform advice and are regularly nominated and used for other expert roles within government.

1.11 Other intermediaries

Besides the different formal roles and institutions in the Danish eco-system of science for policy described so far, there is a large number of think thanks, advocacy groups, knowledge translation units and knowledge brokers. These boundary organisations are not part of the official eco-system of science advice but may provide valuable insights, reports, analyses, and meta-studies that answer to policy and regulatory needs within particular government departments and agencies. Sometimes, these intermediaries serve to facilitate broader dialogue or deliver consultancy services, evidence reviews, or expert statements. In other situations, they may themselves attempt to influence policy in areas of their own interest and expertise, e.g., educational policy, environmental policy, fiscal policy etc.

There exist several informal evidence and knowledge providers in Denmark, such as think tanks (like DEA, AE, Justitia, Mandag Morgen etc.), advocacy groups (like Confederation of Danish Industry, The Danish Chamber of Commerce, Danish Agriculture & Food Council etc.) research foundations (Danish Board of Technology, Rockwool Foundation etc.) and private

consulting firms. These non-governmental organisations are commissioning and offering analyses that, from time to time, influence policymakers and frame policy issues in the public sphere. At times, representatives from advocacy groups may serve as members of official committees and councils alongside academic experts. At other times, analyses and reports from advocacy groups may be used to challenge government-internal research and analysis, and hence create a *competing* source of expertise, sometimes leading to controversies. In contrast to formal science advisory committees and councils, these intermediary knowledge brokers are not restricted to simply elucidating evidence-informed options but may instead be advocating a specific course of action.



1.12 COVID-19 expert reference group

As the impacts of Covid-19 have expanded throughout almost all parts of Danish society, the requirements for internal and external scientific advice have become increasingly visible across government ministries. Responding to criticisms that external scientists were not sufficiently consulted by the Danish authorities throughout the first wave of the epidemic, the government decided in October 2020 to establish a national warning system for risk assessments and measures to cope with the Covid-19 pandemic. To evaluate the quality of the warning system and to provide feedback on different scenarios of reopening society, an external scientific advisory group was set up ('Den faglige referencegruppe'). Members of the advisory group include experts in medicine, epidemiology, social science as well as economics. This multidisciplinary advisory group is provided with secretarial support by the Ministry of Health, with the involvement of relevant agencies and ministries

The independent advisory group has been asked to develop a new framework for scenario planning, which is based on mixed-method approach centred on reaching consensus opinion among the experts. With the external expert reference group in place, the government may acquire independently informed recommendations about next steps in the emergency response, and source new knowledge and studies to the benefit of relevant policies, for instance, in relation to adjusting the track-and-test capacity, behavioural compliance etc. The expert reference group is not expected to provide advice on its own initiative and should not oversee general responsibilities in relation to government decision-making. Rather, it formulates guiding principles for science-based policy decision.

In January 2021, the reference group was commissioned to evaluate which interventions would be most beneficial (or least harmful) when lifting restrictions regarding Covid-19 in Denmark. The group was asked to consider the expected effect of the restrictions on the spread of virus as well as the socio-economic consequences of different policy options. The multidisciplinary nature of the expert group as well as its mandate to provide easy-accessible and rapid science advice, makes the reference group an example of an innovative approach within the Danish eco-system of science for policy, which can be used for further learning.[8]

8 In March 2021, several members of the Covid-19 Expert Reference Group voiced criticism that the group had not been consulted regularly and that the multi-disciplinary expertise in the group had not been mobilised (Domino 2021).

1.13 Reviews and reports of science for policy in Denmark

Science advisory mechanisms in Denmark have been examined on several occasions. In the two publications, *Research-Based Knowledge and Public Policy* (Rambøll 2015) and the discussion paper *Science for Policy: Recommendations for Better Quality of Public Policies* (2016), the Danish Council for Research and Innovation conducted a study of the Danish ecosystem of science for policy. The former is especially relevant. Using interview studies with policymakers, Rambøll explored the demand and preferred mechanisms employed by Danish government departments to acquire and integrate science in policymaking. The report concluded that knowledge mobilisation has become a key priority among Danish policy institutions but that there is "significant potential for improving" the integration and implementation of external expert advice.

More recently, an independent expert group delivered a report *Managing the Covid-19-Crisis: The Early Danish Experience* (2021) to the Standing Orders Committee of the Danish Parliament. The review is an interesting example of parliamentary science advice. The Parliament commissioned the report by establishing an independent expert panel composed of five professors representing expertise within the fields of virology and immunology, law, economics, and public administration. The panel was given six months to conduct the investigation. According to an agreement between the Chairman of the Parliament and the Prime Minister, the expert group was granted access to any government documents related to Covid-19. However, the group was not allowed to interview ministers or public servants involved in the Covid-19 crisis management.

Among other things, the review examines the provision of health science advice to government during Spring 2020. The expert panel investigates the communication and line of command between the Prime Minister's Office, the Ministry of Health, The Danish Health Authority (i.e. national agency responsible for surveillance of health services) and SSI (the national research institute for infectious diseases. See section 1.2). Early in the crisis, The Prime Minister convened the cabinet committee responsible for national security, composed not only of the ordinary members (the ministers of justice, defence, foreign affairs among others, their permanent secretaries, and the heads of the intelligence services) but also the Minister of Health and the heads of national health authorities.

The independent review observes that decision-making during the early phase of the epidemic was heavily relying on internal science services and inter-departmental coordination, whereas external advice was largely absent. While the health authorities delivered "state-of-the-art advice developed with care, given time constraints and uncertainties", the lack of external advice from universities, health professionals and hospitals resulted in a certain narrowness in the available evidence. For the purpose of future emergencies, the expert panel recommends "to set up a series of high-level panels with expertise within epidemiology and virology, macroeconomics, and law." These advisory panels have "to be activated when an epidemic or pandemic is threatening." The review concludes that science advice must be public and multi-disciplinary: "It is only through this combination of multi-source and open advice that political decision makers in government and parliament will receive valid estimates of the risks and uncertainties involved." In other words, the expert group recommends that different sources of expertise are activated and integrated in future emergency management (Grønnegaard et al. 2021).[9]

Finally, the Danish university association, Universities Denmark, has recently issued a white paper with

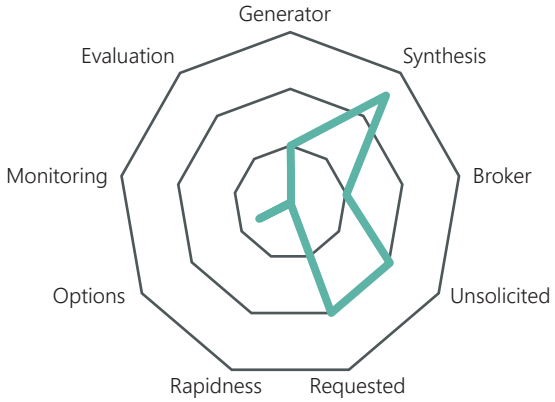
9 It appears that the same conclusion was reached by the Danish government prior to the independent review. In October 2020, the government decided to establish an external scientific advisory group in conjunction with the national warning system for risk assessments, the so-called Covid-19 Expert Reference Group (see section 1.12).

recommendations and guidelines for science advice directed towards both providers and recipients of advisory services. In the report *Principles and Recommendations for Science-Based Collaboration and Advice* (2020), a group of leading experts have formulated six principles that should govern interactions between university researchers and institutions procuring science advice: (1) academic freedom, (2) impartiality of advice, (3) independence of business or political interests, (4) transparency and open advice, (5) reliability and (6) accountability. The paper then applies these principles to essential aspects of the science advisory practice, e.g., providing guidelines for contract negotiation, expectation management, project description, data collection, consultation with stakeholders, and publication and dissemination of results. The guidelines are primarily relevant for government commissioned research at universities (see section 1.3) and for individual advisers engaged in consultancy services (see section 1.9). But they apply to scientific advice in general, including joint programmes with industry or advocacy groups. By providing an elaborate set of principles, it is the ambition of Universities Denmark to supply researchers with a toolkit to avoid misconduct, and to secure that universities engage in open and transparent advisory practices.

1.14 Cross-institutional scoreboard

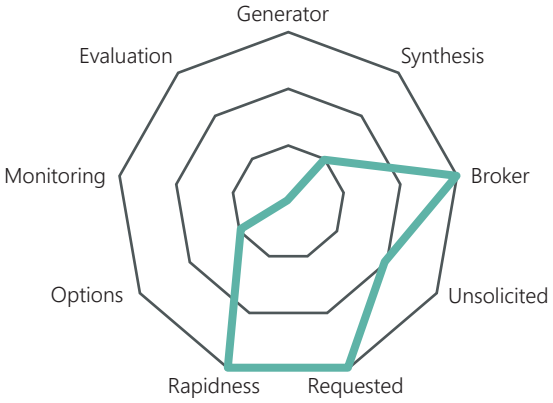
This section sums up Part 1 of this discussion paper by providing a general matrix of mechanisms and practices present in the Danish eco-system of science for policy. The matrix may also serve as inspiration for Danish stakeholders to explore mechanisms and structures of science for policy not currently adopted in Denmark, and to consider the depth and diversity of existing mechanisms. For comparison, the matrix includes three international mechanisms:

1) National Academies. A number of national academies of sciences and letters exist within Europe, covering scholarship in the humanities, law, economics, social science, mathematics, medicine, and all branches of natural and technical sciences. In several European countries, the national academies are part of the science for policy eco-system: they are commissioned by scientific advisory bodies within government institutions to provide evidence reviews, reports and statements, and are regularly used to nominate experts to government advisory bodies etc. In several cases, academies themselves undertake scientific advisory activities, providing unsolicited advice to policy-makers as well as responding to requests. [10]

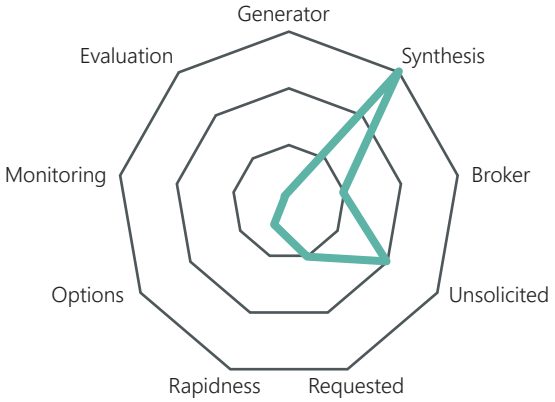


10 As part of the European Commissions' Scientific Advisory Mechanism (SAM), national academies and learned societies provide evidence and advice through a pan-European consortium, Science Advice for Policy by European Academies (SAPEA).

2) Chief Science Adviser. Different models of science advice reflect different political cultures. United Kingdom, Australia, Canada, Cuba, Czech Republic, India, Ireland, Malaysia and New Zealand employ a Chief Scientific Adviser (CSA) to the government. In most cases, the role of CSA is supported by a team and an independent science advisory council to ensure that government policies and decisions are informed by the best scientific evidence and long-term thinking. Several countries also operate with a network of departmental CSAs who act as brokers of scientific advice within individual ministries. In the UK, the government CSA usually serves as chair of the UK's Scientific Advisory Group for Emergencies (SAGE).



3) What Works Units. In the United Kingdom, What Works Units have been operated since 2010. These units are dedicated to the generation, transmission and adoption of evidence by policymakers within areas such as health, social care, education, early intervention, crime, and ageing, etc. At the heart of What Works Units is the ambition to systematically assess and synthesise evidence on what works within their field of expertise. Where gaps in the evidence are identified, some units have resources to generate new evidence through trials and evaluations. Rather than academic publications, the outputs of the units are publicly accessible, for instance, as tools or guiding principles that summarise evidence and provide clear and practical advice for professionals.



Competences / Mechanisms	Knowledge generator	Knowledge synthesis	Knowledge broker	Unsolicited input	Requested input	Rapidness	Identify options	Monitoring	Evaluation
Government research institutions	+++	+++	++	+	++	++(+)	++	++	+
Government commissioned resarch	++	+++	++		+++	+/-	++	+++	
Scientific councils		++	++	++	+	+	+++	+	+/-
Self-governing research institutions	++	++	+(+)	++	+(+)	++	+/-	+++	
Government commissions	+	++	+	+/-	++				+++
Expert panels & committees		++	++	+/-	++		++		
Individual advisers	+(++)	+	+	++	++	+++	+/-	+/-	+/-
Think tanks		++	+	++	+		++	+/-	+
National academies	+	++(+)	+	+	++		+/-		
Chief Science Adviser		+	+++	++	+++	+++	+		
What Works Units		+++	+	++	+	+/-			

Note. This matrix is adapted from Gluckman (2017), and has been further elaborated to cover the Danish eco-system of science for policy for the purpose of this report

Part 2
Challenges and opportunities

2.1 Introduction

While it is outside the scope of this discussion paper to evaluate strengths and weaknesses of instruments and mechanisms for evidence-informed policymaking, this section explores some of the challenges facing the Danish science for policy eco-system in general.

The diversity of science for policy instruments in Denmark is wide-ranging. Advisory services include a broad set of practices and institutions – ranging from government research units, government research institutions, commissioned research at universities, appointed commissions, councils and committees, and a widespread use of ad hoc panels and individual advisers. Their roles include knowledge production, synthesis, brokering, policy analysis, evaluation, risk assessment, consultations and more. A strength of the Danish system is the different and complementary ways in which science and expertise can be mobilised and incorporated into policy. This multi-layered science for policy eco-system facilitates relatively straight-forward access to science advice and expertise within sector domains.

However, this diversity of institutions and mechanisms also presents a number of challenges. A possible challenge in the system is the lack of oversight: the multiplicity of advisory capacities is not coordinated centrally, and hence can lead to fragmentation. Most advisory processes are based in specific policy domains and scientific silos, which often do not integrate expertise from other disciplines. This departmentalisation of science for policy leads to a lack of peer learning and capacity-building universities and policy institutions. Since there exist no comprehensive inventory of advisory services and skills, it can be difficult for government agencies to engage researchers — and, vice versa, for scientists to engage government – outside established policy domains. For instance, in the case of emergencies, such as Covid-19, it has proven difficult to integrate multi-disciplinary science advice in a rapid and effective manner.

2.2 Future emergencies

Emergency planning and emergency management are based on the sector responsibility principle, that is: the branch of government that is responsible for the administration of a particular policy area, is also the lead department in the case of crisis. However, crisis management has a cross-sectoral dimension that calls for coordination among different branches of government, as well as different branches of science and expertise. Therefore, the sector responsibility principle needs to be supplemented with cross-sectoral and cross-disciplinary advisory panels, which can be activated in case of a crises. A particular challenge to the Danish eco-system of science for policy is what type of "structure" is needed to facilitate the provision of such boundary-spanning and cross-fertilisation. The absence of a central national organising mechanism for science advice underlines the pertinence of this challenge.

2.3 Multidisciplinarity

Related to emergency response is another challenge that is equally pertinent to the provision of science for policy: the integration of behavioural, social and human sciences in government science advice. While the role of technical, medical, economical and juridical sciences has been well-established over time as a critical policy resource (e.g., in areas of public health, climate change, business and trade, and security), the integration of e.g., psychology, anthropology, philosophy and cultural studies has not been broadly acknowledged (with few exceptions, such as educational policy). Experts from different disciplines may provide policymakers with a more complete picture of what science knows and does not know, and about the robustness of available evidence. Integrating multi-disciplinary science advice into policymaking has several implications. Experts from the social and human sciences may be integrated in teams of advisers – sharing common skills, balancing attitudes and competences as well as bringing diverse mind-sets, experience and knowledge to complex problems. The Covid-19 crisis has provided a recognition across society that many policy problems call for knowledge about human behaviour, communication, cognition and culture. But implicit hierarchies between disciplines persist and are rarely addressed.

2.4 Independence

Several observers have noted that science advisory practices should be structured so as to protect its independence from political interference and premature filtering in the policy process. There is an inevitable tension between independent advice and departmental policy processes, and it takes considerable diplomacy to create a trusted partnership between an external adviser and departmental officials. For commissioned research at universities (section 1.3) this constitutes a particular challenge. On the one hand, commissioned research is a valuable tool to incentivise universities and to harness state-of-the-art research to inform policymakers. On the other hand, contracts, budgets and topics are stipulated by the government. Some see this as problematic because the questions asked by policymakers have been perceived as short-term, and issues of academic freedom, transparency and independence have been raised (Andersen 2019). Observers fear that evidence is recruited to support policy choices rather than to inform and adjust policies to available evidence and expertise.

2.5 Knowledge exchange between research and policy

During interviews conducted in preparation of this discussion paper it was observed that the use of 'framework agreements' between ministries and universities allows knowledge to flow between university researchers and policymakers – often via reports, position papers, meta-studies, analyses or memberships of advisory committees, bilateral meetings and seminars (Section 1.3). However, a possible challenge to the system of government commissioned research is the lack of pathways to exchange informal and tacit knowledge, and to exchange ideas and recommendations in open-ended and interactive ways. Related to this challenge, there exists only limited support and incentives for researchers to share (non-commissioned) research with policymakers e.g., research which may be relevant to address specific policy problems, but which has not been commissioned as part of an agreement or contract. In comparison, there exist numerous tools and mechanisms to facilitate matchmaking and technology transfer between universities and industrial partners. Similar units that support knowledge exchange and co-creation with policymakers do not currently exist at Danish universities or is scattered across departments.

2.6 A public administration fit for the future

Across OECD and EU institutions there is an increased attempt to strengthen the overall effectiveness, efficiency and relevance of government action, taking into account current societal challenges and needs. Improving the quality and effectiveness of public administration and the predictability of decision-making, policymakers need to promote transparency, trust and integrity, e.g., by streamlining policymaking procedures, improving legislative procedures and by integrating evidence-informed practices and inclusion of stakeholders. This strengthening of public administration may include the mobilisation and implementation of scientific knowledge in policymaking, e.g., by encouraging public administrations to formulate strategies for knowledge mobilisation and by developing key performance indicators for the integration of evidence in policymaking (section 2.8). Improving the absorptive capacity and readiness to integrate scientific advice in Danish policy institutions as well as providing capacity-building, training and skills for evidence use seems to be a key challenge.

2.7 Knowledge translation skills

Another finding in the preparation of this discussion paper (as well as in the literature on the use of evidence in policy) is the need for specialist skills to facilitate knowledge translation. This challenge does not only concern researchers involved in knowledge brokerage, but also relates to the skills needed for policymakers (civil servants at strategic and operational levels) to acquire and implement science advice. To meet this challenge, it is required to develop specialist skills for knowledge translation within universities, as well as stimulate the capacity to use evidence in Danish policy institutions. Among the competences needed are (1) understanding key drivers of the policy process as well as understanding the dynamics of science, including scientific authority, peer review and evidence, (2) synthesising research to provide policymakers with access to robust advice in a timely and relevant manner, (3) managing expert communities effectively, applying knowledge to complex problems, (4) communicating and translating scientific knowledge to non-scientific audiences, (5) engaging policymakers beyond simply communicating research, but identifying options, helping to understand the outcome of different policy choices etc. and (6) engaging stakeholders across the policy landscape to provide a constructive platform for cross-sector dialogue. In short, there is a need to develop skills for knowledge translation as well as improving the understanding and uptake of science in policy institutions.[11] During interviews conducted in preparation of this report it was observed that this "dual competence" in reality constitutes a specialist skillset that needs to be incorporated into universities as well as public administration.

2.8 Impact assessment

The extent to which scientific evidence is used by policymakers in government and public administrations is notoriously difficult to evaluate and measure (Kryl et al 2012, Morton 2015, Bornmann et al. 2016, D'Este et al. 2018, Pedersen et al. 2020). A key obstacle in such evaluations is the attribution problem. Whether or not a piece of scientific advice is used by policymakers is not solely a question of the influence of scientists upon policy but on the ability of policymakers to use research. Rather, than measuring only outcomes, indicators are needed to track and assess the contribution of science to policy. Especially in today's political climate, when policy decisions are questioned and confidence in public institutions, expertise and evidence is increasingly challenged, it is vital to understand the impact of science on policymaking. How can we measure such an impact? How can such measurements help demonstrate the importance of evidence-informed policy? A key challenge in this regard is to identify the most important pathways to policy impact and to identify the most promising indicators to measure the impact of knowledge on policies (similar to indicators that measure the impact of research on industry etc.).

11 This list of competencies draws upon the skills for science advice and knowledge brokering developed by the European Commission, Joint Research Centre (2017). See also Gensby et al. (2019).

2.9 Science of science advice

A common feature across studies of international science advisory systems is the observation that not enough systematic research is available on mechanisms, indicators and best practices of science for policy. Research on research advice is important for both practitioners of science advice and for policymakers acquiring evidence and research (Wilsdon & Doubleday 2013, Fischer et al. 2014, Gluckman & Wilsdon 2016, Spruijt et al. 2014, Oliver et al. 2014, Oliver & Boaz 2019). It can help devise strategies for convening multidisciplinary expertise, help decision-makers to navigate wisely between available mechanisms for science advice as well as support the quality of evidence and expertise in government by 'providing advice on advice' (Pielke 2013). Debates about science for policy often focus on the supply-side of the science-policy interface. But the demand-side is equally important to examine: an effective adviser needs a sophisticated understanding of how policymaking processes work, and the pressures and constraints under which decision-makers operate. On several occasions the OECD (2015), European Commission (JRC 2019) and the International Network of Government Science Advice (INGSA 2014) have emphasised that there is a science as well as a craft of scientific advice, and that advisers need to draw more systematically on research in political science, social psychology and science policy studies which investigates why certain kinds of knowledge are acted upon, and others are not. This requires concerted efforts from both sides – academics and practitioners – to connect the latest scholarship to advisory processes and practices.

References

Andersen, H. (2019): "Problemer med forskningsfriheden?" *Samfundsøkonomen* vol 2: 59-70.

Bornmann L., Haunschild R., Marx W. (2016). "Policy documents as sources for measuring societal impact: how often is climate change research mentioned in policy-related documents?" *Scientometrics* 109: 1477–95.

Craft, J., & Howlett, M. (2013). "The dual dynamics of policy advisory systems: The impact of externalization and politicization on policy advice." *Policy and Society* 32(3), 187-197.

'D'Este, P., Ramos-Vielba, I., Woolley, R. & Amara, N. (2018). "How do researchers generate scientific and societal impacts? Toward an analytical and operational framework." *Science and Public Policy* 45(6): 752–763.

Danish Ministry of Justice (2018). *Kommissorium for Udvalg om revision af reglerne om retshjælp og fri proces*. Copenhagen.

DFiR (2016). *Science for Policy: Recommendations for better quality of public policies*. Whitepaper. Danish Ministry of Higher Education and Science. Copenhagen.

Domino, S. (2021). "Utilfredshed hos regeringens egne corona-eksperter." *Berlingske Tidende* 20 March 2021.

Doubleday, R., & Wilsdon, J. (2013). *Future directions for scientific advice in Whitehall*. Alliance for Useful Evidence and Cambridge Centre for Science and Policy, London, UK.

Fischer, A. R., Wentholt, M. T., Rowe, G., & Frewer, L. J. (2014). "Expert involvement in policy development: A systematic review of current practice." *Science and Public Policy* 41(3), 332-343.

Gensby, U. et al. (2019). Mobilisering af forskningsbaseret viden om arbejdsmiljø: Bedre sammenhæng mellem forskning og praksis. Copehagen. Library for Social Sciences.

FM, Danish Ministry of Finance (2019). *Oprettede råd, nævn, udvalg, centre mv. fra 28. juni 2015 til april 2019. FiU alm. del spørgsmål 506*. Copenhagen.

Gluckman, P., & Wilsdon, J. (2016). "From paradox to principles: where next for scientific advice to governments?" *Palgrave Communications* 2(1), 1-4.

Gluckman, P. (2017). "Perspectives on science advising: what are the skills needed?" Presentation during JRC workshop *Skills for Evidence-Informed Policymaking*. Brussels 17 March.

Grønnegaard, J. (2021). *Managing the Covid-19-Crisis: Report delivered to the Standing Orders Committee of the Danish Parliament. English Summary*. Copenhagen.

INGSA (2014). *Science advice to governments: diverse systems, common challenges*. Discussion Paper. ICSU/ Office of the PM's Chief Science Adviser, Auckland, New Zealand.

JRC, EU Joint Research Centre (2017). *Framework for Skills for Evidence-Informed Policy-Making*. European Commission, Brussels.

JRC, EU Joint Research Centre (2019). *Understanding our political nature: How to put knowledge and reason at the heart of political decision-making*. European Commission, Brussels.

Kryl, D., Allen, L., Dolby, K., Sherbon, B., & Viney, I. (2012). "Tracking the impact of research on policy and practice: investigating the feasibility of using citations in clinical guidelines for research evaluation". *BMJ open*, 2(2), e000897.

Lund, S.R. (2019). "Regeringen har nedsat 138 råd og udvalg." *Altinget* 6. maj 2019. Copenhagen.

Morton, S. (2015). Progressing research impact assessment: A 'contributions' approach. *Research Evaluation* 24(4), 405-419.

OECD (2015), *Scientific Advice for Policy Making: The Role and Responsibility of Expert Bodies and Individual Scientists*, OECD Science, Technology and Industry Policy Papers, No. 21, OECD, Paris

Oliver, K., & Boaz, A. (2019). "Transforming evidence for policy and practice: creating space for new conversations." *Palgrave Communications* 5(1), 1-10.

Oliver, K., Innvar, S., Lorenc, T., Woodman, J., & Thomas, J. (2014). "A systematic review of barriers to and facilitators of the use of evidence by policymakers." *BMC health services research* 14(1), 1-12.

Pedersen, D. B., Grønvad, J. F., & Hvidtfeldt, R. (2020). Methods for mapping the impact of social sciences and humanities—a literature review. *Research Evaluation* 29(1), 4-21.

Pielke, R. (2013). "Letter from America: a memo to Sir Mark Walport". In. Doubleday, R., & Wilsdon, J. (2013). *Future directions for scientific advice in Whitehall*, London, UK.

Rambøll (2015). *Den forskningsbaserede viden i politikudvikling*. Report commissioned by The Danish Council for Research and Innovation Policy. Copenhagen.

Spruijt, P., Knol, A. B., Vasileiadou, E., Devilee, J., Lebret, E., & Petersen, A. C. (2014). "Roles of scientists as policy advisers on complex issues: a literature review." *Environmental Science & Policy*, 40, 16-25.

Universities Denmark (2021). *Principles and Recommendations for Science-Based Advice*. Copenhagen.

Online resources

Advisory Committee for Educational Goals, Danish Ministry of Children and Education
https://www.uvm.dk/folkeskolen/fag-timetal-og-overgange/faelles-maal/lempelse-af-faelles-maal/raadgivningsgruppen-for-faelles-maal/om-raadgivningsgruppen

The Danish Council for Research and Innovation Policy (DFiR)
https://ufm.dk/en/research-and-innovation/councils-and-commissions/the-danish-council-for-research-and-innovation-policy/about-the-council-1

The Economic Councils of Denmark
https://dors.dk/english/institutional-setup

The Danish Council of Ethics – Mandate
https://www.etiskraad.dk/english/mandate

The Danish Council on Climate Change
https://klimaraadet.dk/en

Independent Research Fund Denmark - Research advisory service
https://dff.dk/en/about-us/research-advisory-service

National Institute of Public Health, University of Southern Denmark
https://www.sdu.dk/en/sif/instituttet/organisation

National Research Centre for Working Environment – Mandate
https://nfa.dk/en/Om-NFA/Mission-vision-og-langsigtede-effekter-for-samfundet

Statens Serum Institut (SSI), Danish Ministry of Health
https://en.ssi.dk/about-us

Royal Danish Defence College – Mandate
https://fak.dk/en/about-us/

Geological Survey of Denmark and Greenland (GEUS)
https://eng.geus.dk/about

The Danish Institute for Human Rights
https://www.humanrights.dk/about-us

Acknowledgements

The authors would like to thank the following persons for their input and comments to the discussion paper: David Mair, Kristian Krieger, Lorenzo Melchor, Ulrik Gensby, Karin Kjær Madsen, Lene Kyhse Bisgaard, Flemming Larsen, Steffen Bohni and Ragnar Heldt Nielsen.

ABOUT THE AUTHORS

David Budtz Pedersen is professor of science communication and science studies at the Humanomics Research Centre, Aalborg University. He is the co-editor of several policy reports and academic contributions within science studies and has organised various events and conferences on science advice to governments.

Rolf Hvidtfeldt is assistant professor of science communication and science studies at the Humanomics Research Centre at Aalborg University. He is the author of several papers and books on science studies and philosophy of science and has participated in various events and networks on science advice to governments.