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CRITERIA FOR A GOOD KNOWLEDGE BASE

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Criteria for a good knowledge base

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ABSTRACT

SOCIETY'S TRUST in research-based knowledge relies heavily on following good research practices. Research information is utilised at different stages of a decision-making process in society. Research-based knowledge can provide a background for the goals of the government's proposals and justify the significance of the measures needed to achieve these goals. The reliability of decision-making in society is based on the purposefulness and independence of the decision-making. A dive and well-documented knowledge base used in preparing the laws and decision-making in society increase the openness of the process and allow the decisions to be assessed. In organisations conducting scientific research, the researchers are guided by good scientific practices, which help support the culture of open scholarship. This document is a recommendation by the National Open Science and Research Coordination, which serves as complementary guidelines to the Policy for Open Scholarship. The recommendation is aimed at the drafters of legislation and comprises best practices for building a solid knowledge base on the basis of principles of responsible research. The key purpose of the recommendation is to supplement the guidelines for drafting government proposals.

Key words: culture of open scholarship, open government, RCR, legislative drafting, government proposal, knowledge brokering

CHECKLIST FOR A GOOD KNOWLEDGE BASE

1. FAIRNESS OF SCIENTIFIC KNOWLEDGE BASE

- Create the knowledge base following good research practices.
- Make sure that the knowledge base is built on reliable analyses, as well as openly and honestly reported research results.
- When creating the knowledge base, pay attention to the latest research data and the perspectives of different disciplines and interdisciplinary studies and their results.
- Utilise high-quality scientific databases and develop your data retrieval skills.

2. COMPILING A SCIENTIFIC KNOWLEDGE BASE

- Carefully document the written and individual sources used for the knowledge base.
- Use a phenomenon map to describe complex subjects. Remember to also explain what information is not available yet.
- Take part in the science sparring offered by the Finnish Academy of Science and Letters.
- If you utilise artificial intelligence for this compilation process, share which AI programs you have used and how.

3. DOCUMENTING THE SOURCE REFERENCES

- Write proper and cohesive source references.
- Separate out research information and information from experts clearly from each other in the references.
- Always refer to the original source when possible.

4. AVAILABILITY OF SOURCE MATERIAL

- When compiling the knowledge base, utilise open access research articles and other data materials if these are available on the topic.
- Remember to also make use of the Research.fi portal, which contains publications and data produced by Finnish research organisations.
- When referencing data, aim to ensure that the reference leads to the long-term storage location of the original data source (instead of a website for current events, for example).

INTRODUCTION

THIS DOCUMENT is a recommendation by the National Open Science and Research Coordination (AVOTT), serving as complementary guidelines to the Policy for Open Scholarship. The document was drawn up by the AVOTT workgroup 'Interaction with Decision-makers and Open Administration', the experts of which work in supportive roles related to information and open science in research organisations and administration. Additionally, the document was commented on by the experts of Finnish Academy of Science and Letters' research advice project (formerly SOFI).

These *Criteria for a good knowledge base* guidelines are aimed especially at legislative draftspersons and other employees working in ministries. The document is a collection of best practices for building a good knowledge base. The bases for these best practices are the globally-applied *European Code of Conduct for Research Integrity* (Allea, 2023) and the national guidelines *Responsible conduct of research and procedures for handling allegations of misconduct in Finland* (Finnish National Board on Research Integrity TENK, 2023).

As the practices mostly lean on the principles of responsible science, this summary of the criteria for a good knowledge base has been limited to legislative projects utilising researched information. A large part of preparing and enacting laws is presented to the parliament as government proposals. Research-based knowledge can provide a background for the goals of the government's proposals and justify the significance of the measures needed to achieve these goals (Jukka et al. 2022, p. 8). The principles of good legislative drafting have been collected in a guide for preparing government proposals (*Hallituksen esitysten laatimisohje*, 'HELO' guide, available in Finnish and Swedish). The guide provides general instructions for 'preparing government proposals that are concise but provide the necessary information for parliamentary decision-making, legal interpretation and applying the law, as well as for allowing social discussion and research'. (HELO guide: helo.finlex.fi).

This recommendation on the criteria for a good knowledge base is related to, in particular, chapter II of the HELO guide, 'Instructions for writing government proposals'. Chapter II gives legislative drafters the following instruction: 'It must be clear from the government proposal that it has been compiled by using a good knowledge base'. The *Criteria for a good knowledge base* guidelines aim to specify the criteria for compiling a good knowledge base. In other words, the key objective of the document is to serve as complementary guidelines to the HELO guide.

KNOWLEDGE-INFORMED MANAGEMENT AND CULTURE OF OPEN SCHOLARSHIP IN THE GOVERNMENT PROGRAMME

The objective of knowledge-informed management is decision-making based on information and utilising information to support operations and development, as well as enabling these processes. In decision-making relying on research-based information, the goals for knowledge-informed management include ensuring the quality and usability of data, for example. Data covers both written and orally presented information produced in these operations and during scientific processes, as well as numerical tracking data that allows for reviewing the starting point and the impacts of the measures, for example.

In the government programme 2023, 'A strong and committed Finland', the government has explicitly committed to promoting open government: 'The government promotes efficient and open administration that invests in continuance and cohesive operating methods'. In addition to this, the following is stated with regard to societal decision-making: 'The government will actively utilise social information reserves and research-based data in its decision making to allow allocation of the limited resources to impactful actions'.

ON GUIDELINES OF RESPONSIBLE CONDUCT OF RESEARCH

Following a responsible code of conduct of research and research ethics is key for the reliability of the research and the results it produces. At European level, this work is guided by the European *Code of Conduct for Research Integrity*. This code of conduct was produced by All European Academies, which is why it is sometimes referred to as the Allea code. The Finnish version of the Allea code – Tutkimusetiikan eurooppalaiset käytännöt ja ohjeistus – was published in 2020, with the latest version being an update in English published in 2023. According to the Allea code, good research practices include accuracy, openness, and sincerity in the analysis of the research results. All research must be carefully documented and access to data must be as open as possible, while considering potential limits to its use (Allea 2020, p. 7). The research data must be referenced properly, and, when publishing research results, results that are against the hypothesis must be considered just as valid for publication as results supporting the hypothesis (Allea 2020, p. 8).

The guidelines *Responsible conduct of research and procedures for handling allegations of misconduct in Finland 2023* published by the Finnish National Board on Research Integrity TENK, i.e. 'RCR' guidelines, are based on ethical self-regulation. Thus, the RCR guidelines are general national guidelines that organisations

commit to following. The RCR guidelines are based on the international principle and are thus in line with the Allea guideline.

The RCR guidelines emphasise careful documentation of research work while following the principles of open science. Any prior research information must be considered as early on as during the planning stages, and publications by others must be referred to as appropriate. Incomplete referencing to previous research results and inadequate documentation of research data demonstrate disregard for good scientific practice (Finnish National Board on Research Integrity TENK 2023, p. 13 & 18).

As advocates for open science, we want to promote the search for and discovery, assessment and consistent use of research data to support decision-making and as part of open government. Searching for and active utilisation of research-based knowledge in societal decision-making requires understanding of the basis of good scientific practice.

The following four chapters describe what the criteria for a good knowledge base consist of, through the key perspectives of the guidelines of responsible conduct of research.

CRITERIA FOR A GOOD KNOWLEDGE BASE

1. FAIRNESS OF SCIENTIFIC KNOWLEDGE BASE

A fair scientific knowledge base relies on the basic principles of responsible conduct of research: The knowledge base is based on reliable analyses, as well as research results collected, reported and communicated in a transparent, impartial and fair manner (cf. Allea 2020, p. 6; Finnish National Board on Research Integrity TENK 2023, p. 12). The knowledge base considers the latest research data produced through different methods and approaches, while at the same time showing appreciation for the different parties involved in research activities. In practice, this means a balanced way of referencing different studies and considering research results supporting different outcomes (Allea 2020, p. 6). The exclusion of research findings that are important for the conclusions or scientifically unfounded selection of results constitute as distortion of research findings (Finnish National Board on Research Integrity TENK 2020, p. 17). The significance and impacts of research results must be assessed responsibly and realistically, and the applicability of the results, for example, should not be overstated. (Allea 2020, p. 6; Finnish National Board on Research Integrity TENK 2023, p. 18).

When compiling the scientific knowledge base, it should be considered that there may be both discipline-specific and interdisciplinary research on the topic. Interdisciplinary research supports a diverse understanding of phenomena and can often be applied better to the information needs of societal decision-making (Huutoniemi 2014, p. 2 & 7). Different research methods, providing qualitative or quantitative results, for example, can be used in different disciplines.

National legislative drafting guidelines and process guides often describe law drafting as a rational activity (Lonka et al. 2020, p. 3; Uusikylä et al. 2023, p. 24). In practice, however, a single draftsperson of legislation has only a limited knowledge base available to them, limiting the realisation of rationality (Lonka et al. 2020, p. 4; Uusikylä et al. 2023, p. 144). In an ideal situation, the data retrieval skills of the draftsperson should also be at a level that allows them to compile a fair knowledge base. The institutional realistic law-drafting model presented by Jyrki Tala in 2009 better considers the unequal availability of information at the different stages of law-drafting. The model emphasises the role of expert communities rather than individuals (Lonka et al. 2020, p. 6)

Researchers and knowledge brokers can support decision-makers in compiling and guaranteeing a diverse knowledge base in many ways. For example, the Finnish Academy of Science and Letters has produced various guidelines and models for knowledge brokering that can be applied and utilised in compiling a knowledge base. Researchers can, for example, help the draftspersons to form an overall picture of what is known, where the evidence is strong and what is not yet known based on the available research information. Decision-makers should also have available and in use summaries of research results prepared by researchers and/or knowledge brokers, as well as other knowledge syntheses on the subject being prepared (The Finnish Academy of Science and Letters 2024). Decision-makers should also have access to high-quality research databases.

2. COMPILING A SCIENTIFIC KNOWLEDGE BASE

A scientific knowledge base may consist of expert statements, statements issued by a research organisation, scientific publications (original studies, meta-analyses, systematic reviews) and published statistics (Jukka et al. 2022, p. 11). In addition to the above, research infrastructures and grey literature based on research and expert knowledge, such as PowerPoint presentations and personal correspondence/communication, should be used in the compilation of the knowledge base. In this case, it is also important to ensure careful documentation of the knowledge base's source references (see section 3). Many universities and research institutes produce research-based reports, such as white papers, which are easy for administrative experts to use. Various research materials can be used to form a knowledge synthesis on the topic (The Finnish Academy of Science and Letters 2023, p. 54).

Pre-drafting is the first phase of the law drafting process, one of the key elements of which is reviewing the existing knowledge base. If necessary, a study or a review may be commissioned for pre-drafting to supplement the knowledge base. (Finnish Government 2022, p. 17; Legislative Drafting Process Guide: https://lainvalmistelu.finlex.fi/en/). The Strategic Research Council (STN) submits an annual proposal to the Government on various themes of strategic research. The Government makes a choice on the themes based on its current research needs. The projects of strategic research produce, among other things, policy recommendations that provide research data produced in research projects in a concise format to support societal decision-making (Academy of Finland).

Artificial intelligence can be used as a tool for legislative drafting at different stages of the process and in different ways, such as for reviewing different research materials. Artificial intelligence has been used, among other things, in the automation of the drafting of the introductory wording of the act (Lonka et al. 2020, p. 14). Artificial intelligence can also be used to search for materials, write

background memos and document the sources used (Ministry of Transport and Communications 2024). According to the guidelines of the Code of Conduct for Research Integrity, the use of AI should be reported openly (Allea 2023, p. 7). It is important to mention how and what kinds of AI applications have been used. Ethical guidelines for public administration operators have been produced as part of the Open Government's 4th Action Plan (Avoin Hallinto 2023).

When information in decision-making is needed on a complex topic, a phenomenon map can be used to provide a broad general view. The phenomenon map consists of units that structure the phenomenon in different ways (SOFI; Phenomenon Map). When creating the general view, it should be considered what information is not yet available. The Finnish Academy of Science and Letters supports the information needs of societal decision-making by organising science sparring. Science sparring is a guided discussion between researchers and legislative draftspersons based on the background materials of legislative drafting (The Finnish Academy of Science and Letters 2023, p. 63).

3. DOCUMENTING THE SOURCE REFERENCES

According to good scientific practice, work carried out by others must be respected and due credit given to the achievements of others by using accurate references (Finnish National Board on Research Integrity TENK 2023, p. 14). The point of the references is to tell the reader which part of the text is source data and which part the author's own output. An appropriate reference style can be used to make the references so that the original source can be accurately identified (Nieminen et al., 2019, p. 70 & 73). For the sake of clarity, the same reference style must be applied throughout the entire document.

Sources must be referenced inside the text, in connection with tables and images, and in the list of literary sources (Finnish Social Science Data Archive, no date). References are made only to the source read/used, and the original source must be primarily used as a reference. For example, scientific information (peer reviewed articles, etc.) and expert information (statements, etc.) can easily get mixed up and should therefore be clearly referenced (Jukka et al. 2022, p. 8). If it is impossible to use the original source, a secondary source can then be used for the reference. 'Original source' refers to the publication in which the subject in question was first reported.

4. FINDABILITY AND AVAILABILITY OF SOURCE MATERIAL

When compiling a scientific knowledge base, the identification of relevant information and the discovery and availability of source material are essential.

The commitment of research organisations, funders and publishers to open science has made it possible to increase the availability of research information considerably. About 80% of Finnish research is published with open access (Research.fi, most recent information from 2022). Internationally, open scholarly publishing accounts for slightly less than 60%.

Open science supports the access to research information of experts working in the administration regardless of the extent of datasets obtained by the organisation. In compiling a scientific knowledge base, it would be advisable to do any data retrievals in research databases that allow for advanced searches and forming a comprehensive view of the research carried out on the subject. Not everyone working in the administration has access to research databases, which is an obstacle to extensive literature searches and thus undermines the compilation of the scientific knowledge base. In such situations, it is therefore a natural choice to turn to the information services provided by the organisation.

Scientific and professional publications, data, researchers and projects produced by Finnish research organisations have all been brought together in the Research.fi portal, which can contribute to compiling the source material of the knowledge base and reaching the experts in the field of research carried out in national research organisations. The search features of the Research.fi portal are under development, also allowing for more detailed searches. The challenge of finding relevant knowledge may be the limited metadata of publications and other materials: currently, information available on publications mainly includes the headlines and keywords, while summaries of publications are also produced by some organisations.

The development plans for the Research.fi portal and the collection of publication data, i.e. the production of publication data, could also consider the needs for advanced information searches from the perspective of administrative users. The development of metadata for both search properties and publications and other materials, in cooperation with data producers (research organisations) and those needing this data – including the administration of the state and local government authorities – could make nationally produced research data more accessible, discoverable, and usable to the administration.

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