

THE FUTURE OF KNOWLEDGE USE IN SOCIETAL DECISION-MAKING

FINNISH EXPERIENCES AND NEW DIRECTIONS

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Wicked problems and the transformation of the information environment compel us to rethink how knowledge is used in societal decision-making. The improvement of the balance of information supply and demand and the strengthening of the position of scientific knowledge are important goals, but they alone are not enough. A new mindset, new ways of working at the knowledge-policy interface and structures that facilitate these new ways are required.

The perception of decision-making as a process based on knowledge and expertise must be expanded. Decision-making must be able to simultaneously compile diverse knowledge and expertise, increase people's engagement and make good use of the new opportunities offered by digitisation. Those responsible for preparing decision-making must be familiar with the different approaches to knowledge use and know how to plan knowledge use in a way which best suits each situation.

Well-functioning decision-making in an increasingly multidimensional information environment and an arena of competing values and interests is vital for our future. Although Finland is often considered to be a pioneering country in research, education and good governance, the prevailing ways of using knowledge in decision-making and developing knowledge use are no longer enough for resolving the major challenges ahead of us. Various parties must develop ways of working at the knowledge-policy interface, co-operating more closely with each other, and the strategic weight of developing the interface must be increased in society.

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The future of Knowledge use in Societal decision-making

This working paper is an outcome of the co-operation between Sitra employees (Hellström, Ikäheimo) and the Academy of Finland employees who took part in an expert exchange in Sitra (Hakapää, Lehtomäki, Saari). One of the goals of the co-operation has been to expand both parties' understanding of different ways of using knowledge in decision-making and building a collective insight into the development of knowledge use in Finland.

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1 FOCUSING ON THE PRACTICES OF KNOWLEDGE USE

Societal decision-making is subject to many intersecting pressures for change. In the era of the internet and social media, decision-making should be able to react more quickly to people's needs and be more engaging, open and transparent. At the same time, decision-making should be able to tackle the major challenges of our time by being more long-term, strategic, phenomena-driven and knowledge-based.

The quantitative increase in the amount of data, combined with the development of data analytics and artificial intelligence, gives rise to hope for more agile approaches and services tailored to individual needs. On the other hand, the reliability of information is jeopardised by the non-transparency and biases of algorithmic decision-making and the increased volume of all kinds of disinformation, which has complicated the evaluation of the reliability of information.

At this crucial turning point characterised by intersecting expectations and pressures for change, the question arises: What kind of knowledge use would strengthen knowledge-informed decision-making and pluralist democracy and make good use of the new opportunities offered by digitisation?

In our opinion, knowledge use in societal decision-making has not taken the challenge posed by wicked problems seriously enough. Already by definition, knowledge about wicked problems is so open to interpretations that there are no easy solutions, let alone solutions suitable to all situations. We need practices that make it possible to align different kinds of expertise and expert knowledge and to take multiple perspectives into account throughout the preparation process.

In this report, we review an extensive set of practices that can be used to increase the adoption of knowledge, strengthen the networks between producers and users of knowledge, promote the emergence of solutions and facilitate multisource, multiperspective interpretation of

knowledge. When describing the different practices, we also discuss the assumptions they are based on, the requirements of their application and the new capabilities needed in the use of knowledge.

Our main message is that decision-making succeeds best when the ways of using knowledge are compatible with

What kind of knowledge use would strengthen knowledge-informed decision-making and pluralist democracy and make good use of the new opportunities offered by digitisation?

the nature of the phenomena or problems concerned. Those who take part in preparing decision making must stop and contemplate the problem.¹ Without this, the processes of using knowledge tends to be planned and executed as before, not considering how well the customary approach is suited to the situation at hand.

The strengthening of the position of scientific knowledge is a topic that often comes up when discussing the development of societal decision-making. However, societal decision-making is not only about how scientific knowledge can be used in influencing decision-making but also what kind of use of knowledge is required by decision-making in different problems and decision-making situations. Consequently, the approach adopted in our working paper is to contemplate how

¹ See, for example, Heinonen 2019.

decision-makers and supporting civil servants could use knowledge in a more versatile manner.

Finally, we present four development principles, on the basis of which knowledge use in societal decision-making

could be developed and managed more strategically. We believe that with better planning of knowledge use in decision-making, public power can be exercised in a more long-term, responsible and effective manner.²

WHAT IS KNOWLEDGE AND WHERE ARE DECISIONS MADE?

The role of knowledge and expertise and the time and place for societal decision-making are subject to extensive debate in our society.

In this working paper, **knowledge** refers not only to scientific knowledge but also foresight knowledge, learning from experiments, tacit knowledge and other forms of knowledge. Our view is that in modern society, one must seek to understand different forms of knowledge and different ways of constructing knowledge. Expertise must also be understood more broadly and sought from a more diverse range of sources. It may stem from research and from experience and insight.³ Expertise can also be collective.

We understand **knowledge use** broadly as all activities associated with knowledge that are carried out by an individual or an organisation in connection with decision-making or its preparations. Knowledge use encompasses making the best use of existing knowledge, the interactive construction of knowledge and the collective sense-making of knowledge that builds understanding.

We consider **societal decision-making** to be a continuous process that consists of much more than just individual moments of decision-making. It is also about creating a knowledge base for decision-makers, influenced by official preparation processes and other factors, such as individuals' values, ideologies, life experiences, social environment and informal interaction.⁴

² In Finland, the shared values of state administration were defined in the Government decision in principle "On state personnel policy", issued in 2001. They are effectiveness, transparency, quality and expertise, trust, service principle, impartiality and independence, equality and responsibility (see Ministry of Finance 2015).

³ See Jakonen 2017.

⁴ Decision-making is rarely based on evidence and rational deduction alone. The European Commission's Joint Research Centre (JRC) has launched the Enlightenment 2.0 initiative to compile scientific knowledge about drivers that influence decision-making and political discourse, such as values, identity, emotions, frameworks of thinking and group power. The goal is to understand how the impact of scientific knowledge could be increased in decision-making. For more information about frameworks of thinking, see also Lehtinen 2018.

2 KNOWLEDGE USE PRACTICES ARE CONTEXTUAL

Simple, complicated and wicked problems require different approaches to knowledge use. The optimal approach also depends on how clear and uniform the goals that the decision-makers are. For this reason, it is important to stop and contemplate the problem and to identify the nature of the problem and the decision-making situation correctly. The concept of knowledge brokerage and the discussion revolving around it offer a useful frame of reference for reviewing different approaches.

There is an increasing need for frames of reference that offer a broad perspective on knowledge-informed societal decision-making because different approaches to the use of knowledge are suitable for different problems and decision-making needs. Our view is that the concept of knowledge brokerage⁵ and the discussion revolving around it offer a useful frame of reference for developing the use of knowledge in societal decision-making, provided that the concept is understood broadly enough.

When interpreted literally, knowledge brokerage may be associated with financial brokers. The concept was born out of the scientific community's need to increase the impact of scientific knowledge. Typically, it has been regarded as an intermediary organisation or person-bridging knowledge production and decision-making (cf. knowledge broker) or a practice or method for transferring knowledge (cf. knowledge brokering).

However, during the past decade, the discussion about the concept has also started to emphasise the aspects of knowledge adoption, refining knowledge, creating understanding, and engagement. As a result, the key issue is not mere knowledge transfer but the construction and refinement of knowledge and understanding through complex interaction processes.⁶

We have identified three different approaches to using knowledge by reviewing knowledge brokerage literature. They differ in terms of how uniform or easily compatible decision-makers' goals regarding the problem are⁷ and how clear or open to interpretations the knowledge base supporting the resolution of problems is. Together, these influence the nature of interaction that is required between knowledge and decision-making. We have named the different approaches according to their characteristic mode of interaction: transferring, connecting and engaging.⁸

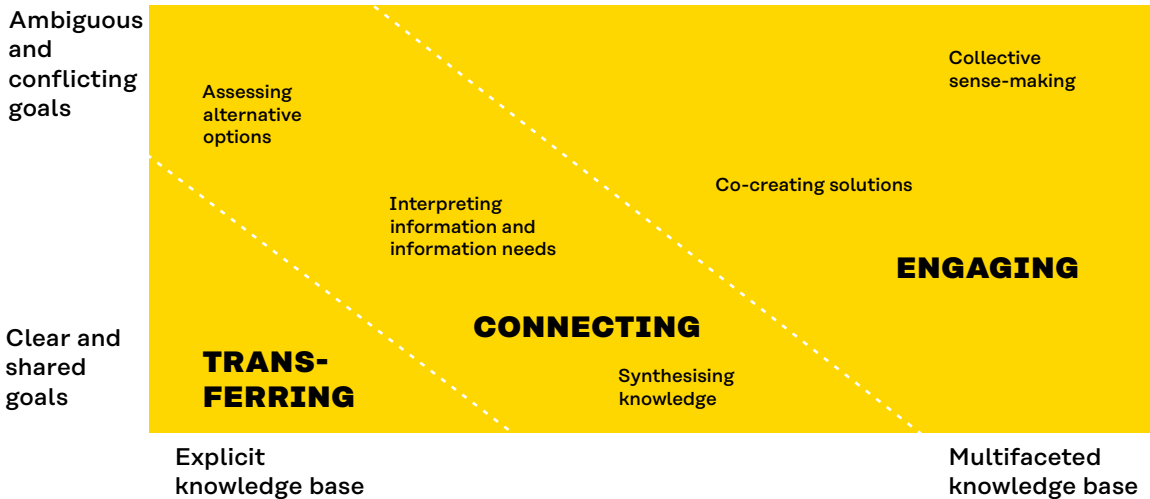
Knowledge use as a *transfer* activity involves the least amount of interaction. The approach is based on the straightforward transfer of knowledge without compiling or making sense of knowledge. In the *connective* approach to knowledge use, interaction is more multidimensional. The aim is to connect various sources of knowledge, networks and worlds of knowledge and decision-making to each other more strongly than in transferring activities. In this case, the connecting of knowledge may also refer to making comparisons or compilations or making sense of knowledge and turning it into a format that can be understood by decision-makers and people in general. In the *engaging* use of knowledge, knowledge production and decision-making are not considered separate domains. The goal is that

⁵ For example, Turnhout et al. 2013; Karner et al. 2011.

⁶ Karner et al. 2011.

⁷ In addition to differences of opinion, another influencing factor may be the perceived significance of questions of power (who wins and who loses).

⁸ In this tripartite categorisation, we have been inspired by three repertoires (supply, bridge, facilitate) of operating models by Turnhout et al. (2013) that strengthen the impact of research-based knowledge. See also Hellström 2019.

IMAGE 1. APPROACHES TO KNOWLEDGE USE IN SOCIETAL DECISION-MAKING⁹

problems are framed, knowledge is produced and interpreted, understanding is extended or solutions are sought in interaction that brings different experts and decision-makers together.

The different approaches to knowledge use also differ in terms of the perception of what is considered to be knowledge or expertise. The transferring of knowledge emphasises the significance of impartial evidence as a basis for decision-making, whereas the engaging use of knowledge underlines the diversity, context dependence and openness to interpretations of knowledge.

The different approaches should also reflect the nature of the problem to be solved. It is important to identify the nature of the problem correctly. Simple, complicated and wicked problems benefit from different approaches to knowledge use.¹⁰

Simple problems of a technical nature can be resolved, for instance, by searching for, screening and transmitting

relevant information (*transferring*). In such cases, problems are stable, solution options are clear and a consensus prevails regarding them.

Complicated problems require the extensive collection of evidence. When the diverse connections related to the problem can be identified, necessary evidence can be compiled and synthesised and bridges can be built between different kinds of expertise needed to manage the problem (*connecting*).

Wicked problems, often also called complex¹¹ problems, are of an extremely multidimensional nature and linked with numerous other phenomena. With these kinds of problems, several people and issues interact in unexpected ways and, as a result, the problems are often emergent. Climate change and the increase in inequality are examples of typical wicked problems on the societal decision-making agenda.

⁹ The presentation is inspired by different approaches to science advice introduced by Ansell and Geyer (2017) and Geyer and Rihani (2010). Geyer and Rihani's thinking is based on the so-called Stacey diagram from 1993.

¹⁰ In this context, Raisio, Jalonen and Uusikylä (2018) use the categorisation for tame, messy and wicked problems. They differ from each other depending on how great an interdependence there is between different aspects and subsystems of the problems, how strongly different perspectives, values and strategic intentions disperse with regard to the problem and how great an uncertainty there is because of the various problem-related risks and changing circumstances.

¹¹ In different problem types, it is important to differentiate between complicated problems and complex problems. For the first kind of problems, the connections related to the problems can be identified reasonably well and the related changes can be foreseen, whereas for the latter, there are considerable uncertainties related to the identification of connections and their influence on one another is difficult to foresee.

Wicked problems can appear different depending on the point of view. Knowledge related to them is often so open to interpretation that evidence can be found to support even entirely opposite conclusions. Different research designs and materials used in studies may also lead to different kinds of evidence. For these reasons, among others, managing wicked problems successfully requires a broad perception of knowledge and expertise as well as the consideration of multiple perspectives in the early stages of policy processes.

Wicked problems cannot be eliminated as they transform and renew constantly. When managing them, the democratic dimension of decision-making is emphasised, which means that the construction and use of knowledge must also be more interactive (*engaging*). Nevertheless, in connection with wicked problems, it must be taken into account that all three approaches to knowledge use are to some extent necessary as meaningful engagement usually includes some elements of connecting and transferring.

Different approaches must not be regarded as the juxtaposition of scientific and other knowledge, although the role of scientific knowledge is underlined in approaches that focus on transferring and connecting knowledge. Scientific knowledge and academic expertise also play an important role in the engaging approach to knowledge use. Even with the engaging approach, it is not assumed that all knowledge is of equal value or that everyone interested could participate; instead, the key point is to offer a way of bringing together, in a useful manner, various forms of knowledge valuable for decision-making and different views.

Each approach has its situation-specific strengths, challenges and risks, many of which are associated with the context and manners of their optimal application. Nevertheless, all three approaches offer suitable means for facilitating how people's voices are heard or strengthening their engagement and making good use of the new opportunities emerging with digitisation.

In the next chapter, our aim is not to systematically describe the strengths or risks associated with the approaches but to describe the assumptions behind the approaches and to provide examples of related practices.

THE DEVELOPMENT OF DEMOCRACY AND DIGITISATION MUST BE INCLUDED IN THE KNOWLEDGE BROKERAGE DISCUSSION

The knowledge brokerage discussion has not paid sufficient attention to the relationship between knowledge-based decision-making and democratic decision-making, or between "expertocracy" and democracy. The current tension between these two is not satisfactory for those who call for more strongly knowledge-based decision-making, nor for those who wish for a stronger citizen focus in decision-making. However, these points of view often overlap. If a decision is not based on a thorough understanding of citizens' needs, it could hardly be considered legitimate. Furthermore, a thorough understanding of the phenomenon at hand cannot be reached without a versatile consideration of the citizen focus in knowledge use. At its best, knowledge required by decision-making can be constructed through the dialogue of different kinds of knowledge (academic knowledge, experience-based knowledge, administrative expertise, foresight knowledge, etc.) and through processes of interaction between diverse parties, negotiation and the construction of collective understanding.

Another area where it must be possible to increasingly apply the knowledge brokerage frame of reference is that where there are opportunities to use digitisation and advanced data analytics to support decision-making. Digitisation makes it possible to collect and screen information more efficiently and to ensure people's engagement in societal discussion. With the aid of digital methods of information refinement, such as artificial intelligence and data analytics, data masses from different locations can be combined in a new way and a rough situational picture can be created in real time.¹² Nevertheless, the benefits offered by technological development cannot be achieved without reforming the approaches to the use of knowledge and to decision-making.

¹² Takala 2018.

3 THREE APPROACHES TO USING KNOWLEDGE

We have identified three different approaches to the use of knowledge in societal decision-making: transferring, connecting and engaging. They differ in terms of the kind of interaction between knowledge and decision-making they are based on. Managing wicked problems in particular requires practices that focus on joint sense-making and problem-solving. In this case, knowledge is not only shared or compiled, but diverse knowledge from a multitude of sources is interpreted together and solutions are produced interactively.

1. Transferring knowledge relies on evidence

Public discussion often calls for evidence-based decision-making. In this case, the assumption is that it is possible for the decision-maker to gain reliable knowledge about reality and that relying on appropriately produced knowledge improves the quality of decision-making. The methods that focus on transferring knowledge emphasise the significance of evidence. The aim is to have knowledge that is most useful for decision-making, or even “correct” knowledge, in the right place at the right time.

A clear hierarchy of evidence is perceived as prevailing between different types of knowledge and, as a result, universal criteria can be used to assess the accuracy of the picture that a certain piece of evidence gives of reality. The role of scientific evidence is emphasised, while assessments stemming from practical experiences and based on opinions are usually considered weaker evidence among those who promote the evidence-based approach.¹³

The transferring of evidence starts from the assumption that evidence is in a documented format, in the possession of leading experts or can be produced to order. The production and use of evidence are seen as somewhat separate domains, in which evidence is assumed to have a linear impact on decision-making through the party that

acts as a “broker”.¹⁴ The keywords associated with this approach include “search”, “identify”, “assess” and “transfer”. The approach highlights the broker’s own expertise and neutrality and the maintenance of a sufficient distance in relation to decision-making.¹⁵

The transferring of evidence is based on a technical-rational view of decision-making. The transferring of evidence has the best preconditions for success when the agenda consists of simple, clearly defined problems of a technical nature that do not involve strong ideological juxtapositions.

Digitisation increases the efficiency of the transferring use of knowledge, especially with regard to searching, screening, visualising and communicating information. When problems are simple enough and there is a sufficient amount of high-quality data available, the opportunities offered by digitisation can also be used to make recommendations¹⁶ and, in some cases, even in the automation of routine decisions. However, in societal decision-making, this requires radical transparency with regard to both data and algorithms, in order to make it possible to assess potential errors and biases openly and reliably.¹⁷

In a world of open data and fast digital communications, people are “remote terminal points” of the

¹³ See, for example, Raisio, Jalonen and Uusikylä 2018.

¹⁴ Turnhout et al. 2013.

¹⁵ See Turnhout et al. 2013.

¹⁶ In consumer services, examples of recommendations enabled by digitisation include the operating models of Netflix and Spotify.

¹⁷ Ahonen 2018.

Example 1.**STRATEGIC RESEARCH REVEALS WHO KNOWS WHAT AND WHAT DO THEY RECOMMEND**

The Strategic Research Council,¹⁸ operating at the Academy of Finland, funds research that has great potential for societal impact and supports concrete solutions to major challenges requiring multidisciplinary approaches. The council proposes research themes to the Government of Finland annually and then turns the themes chosen by the government into programmes, the duration of which ranges from three to six years.

Strategic research has developed means for providing policymakers and decision-makers with a quick answer to the question: "Who knows and what do they know?"

The so-called solution cards provide a concise overview of ongoing strategic research and existing results. The latest policy recommendations produced by strategic research projects can also be easily found in one place.

When it comes to wicked problems, the solution cards call for co-operative and deliberative solutions, and a new kind of dialogue, among other things. Recommendations deal with topics such as how engaging citizens more closely with decision-making helps decision-makers to make more considered decisions that take various points of view into account.

Both the solution cards and policy briefs aim to transfer knowledge to the tables where decisions are made. At the same time, they strengthen networks by making research and experts more familiar to those who need knowledge, which also makes it easier to find potential partners. In this manner, strategic research builds the foundation for the connecting and engaging use of knowledge, too.

international information network, both at work and during their free time.¹⁹ Much of the information transferred to decision-making is also available to individuals, which in part improves their opportunities to take part in societal discussion and activities. Furthermore, people's engagement in the production of scientific evidence can be promoted through citizen science,²⁰ for instance.

2. Connecting builds bridges for knowledge

In many of the questions on the societal decision-making agenda, the problem is not as clearly defined as described above. The goals and interests of the decision-makers may be highly dispersed, and knowledge may be fragmented or otherwise difficult to interpret, which also complicates the collective definition of the problem.

In this case, transferring evidence to decision-making is no longer straightforward but requires the capability of

building bridges between different providers and users of knowledge. Depending on the nature of the situation and the parties to be bridged, three different approaches can be identified: A) the assessing of alternative options; B) knowledge synthesis; and C) the sense-making of knowledge and the creation of networks.

A. Assessing alternative options

Sometimes decision-makers have a shared view of the knowledge associated with the problem but are facing the challenge of different values, interests and goals related to decision-making. In this case, it is important to be able to compile knowledge that helps decision-makers better identify and compare points of view and effects related to different alternative options. What is needed is the building of bridges between knowledge of different options.

The approach resembles the ideal model that has been presented with regard to the relationship of science and

¹⁸ Further information: www.aka.fi/en/strategic-research-funding/.

¹⁹ Hyssälä and Backman 2018.

²⁰ There are several alternative definitions of citizen science. They differ in terms of citizens' roles in defining questions, collecting knowledge, offering knowledge processing and other resources, developing solutions or interpreting knowledge, for instance, and the intensity of the researchers' control over citizens' actions, among other things. However, the goal is usually to increase scientific knowledge in co-operation with the scientific community.

Example 2.**IMPACT ASSESSMENTS IMPROVE THE QUALITY OF LAW DRAFTING**

In terms of the drafting of laws in Finland, different ministries are required to assess the legislation they are drafting or have it assessed by other parties. The key impact assessment findings are appended to the government proposal. The aim of the assessment is to produce knowledge for drafters, decision-makers and stakeholders about the potential impacts of the planned legislation and its significance. Assessments can also be used for planning means to mitigate potential negative impacts.

Ideally, the assessment should be launched in the early stages of drafting and will be taken to a deeper level as the drafting proceeds to the identification of alternative solutions. Good assessment practice also includes the post-assessment of the impacts of the reform that has been carried out. When knowledge about the functionality of earlier legislation is compiled, knowledge can be transferred to law drafting about those common reasons why legislation does not always function appropriately.

In Finland, an independent Council of Regulatory Impact Analysis²¹ has been established at the Prime Minister's Office. Its operations started in 2016. The council does not assist in carrying out impact assessments; instead, its task is to improve the quality of law drafting and, in particular, the impact assessment of government proposals. The council issues statements on the drafts of government proposals, especially concerning impact assessment. By highlighting observations about shortcomings in law drafting, the Council of Regulatory Impact Analysis has succeeded in increasing the pressure to develop impact assessment.²²

politics. In this, the task of research is to describe alternative solutions and their effects as impartially as possible, enabling the decision-maker to make a decision that is based on the best knowledge but still respects the chosen values.

Terms characteristic of this approach include “analyse relevant points of view and alternative options”, “assess their effects” and “enable comparison”. Typical examples of methods include calculation and modelling services, expert hearings, impact assessments and assessment councils.

The approach requires an ability to manage diverse points of view, multidisciplinary competence, neutrality and an ability to present and compare knowledge systematically. Regardless, modelling and a pre-decision-making impact assessment, for instance, usually describe potential impacts that can only be verified afterwards.²³

Trust in different sources of knowledge becomes the key issue in this approach: who people listen to, whose knowledge is considered essential and why. The challenge is that decision-makers often do not have the ability or time to assess the quality of knowledge. Sometimes, decision-making may place too much trust in the

impartiality of knowledge, but the use of knowledge may also be purpose driven.²⁴ Especially when decision-making is subject to strong values, conflicts of interest and efforts to gain power, it is influenced by many factors other than knowledge. Instead of evidence-based decision-making, the goal should be decision-making that carefully scrutinises evidence.

B. Knowledge synthesis

At times, decision-makers may have a shared goal for the resolution of a problem, but the knowledge base is fragmented because of the multidimensional nature of the problem. In this case, it is important to compile justified knowledge, points of view and types of expertise that are relevant to the problem so that a more comprehensive picture and a shared view can be established of the problem and its solution. Bridges are needed between different sources of knowledge and types of expertise.

Keywords associated with this approach include “compile”, “connect points of view”, “clarify”, “synthesise” and “visualise”. Typical examples of practices include

²¹ Further information: <https://vnk.fi/en/council-of-regulatory-impact-analysis>.

²² See Rantala 2019 and Keinänen et al. 2019.

²³ Cf. Keinänen et al. 2019.

²⁴ Hellström and Ikäheimo 2017.

Example 3.**SCIENTIFIC EXPERT PANELS SUPPORTING SUSTAINABLE DEVELOPMENT**

The resolution of demanding societal problems requires an ability to understand wholes. To support sustainable development, several expert panels that combine expertise from various fields of science have been established in Finland in the last decade, such as the Expert Panel on Sustainable Development (the current Sustainability Panel), the Finnish Climate Change Panel, the National IPBES Panel, the Bioeconomy Panel and the Economic Policy Council.

A comparison of different panels²⁵ shows that there is no single right way to organise the operations of an expert panel; instead, panels may have very different mandates, goals and operating models.

Panels may operate as independent “watchdogs”, assessing politics or engaging civil servants and decision-makers in their operations. They may define their own agenda themselves or receive assignments from decision-makers. At times, scientific support may be institutionalised as research units operating under central government. Panels may also act as high-level scientific advisers or a third party between science and politics that encourages participation and offers a platform for interaction. The operating model of a panel may also be a combination of the approaches described above.

systematic reviews, synthesis reports, committee work and expert panels²⁶ that compile expertise from different fields.

The synthesis communicated to decision-makers may be descriptive or analytical or contain recommendations. It can be either created by civil servants or ordered from experts. Unless the synthesis is made through extensive co-operation among experts, the abilities and mental frames of the author of the synthesis may influence the perceived legitimacy of the outcome. On the other hand, if the synthesis is considered to be of high quality, it can help in challenging prevailing perceptions and gatekeepers of knowledge.

Syntheses and systematic reviews require a lot of effort and resources. In the future, artificial intelligence and machine learning are expected to increase the efficiency and automation of the technical stages of knowledge production, especially when it comes to searching for information, screening large masses of data, encoding and grouping.

C. The interpretation of knowledge and the creation of networks

When the problem at hand is at the same time multidimensional and subject to diverging goals, what is required is a special ability to interact with numerous different providers and users of knowledge. The active interpretation of both information and information needs

and the creation of networks may improve the adoption of knowledge and the coverage of several knowledge-related points of view and ensure that knowledge is produced so that it meets the needs of societal decision-making.

When information needs to be interpreted from many different points of view, networks and interaction become an element that is as equally important as the information itself.

On one hand, the interpretation of information needs increases information producers’ understanding of the decision-maker’s goals and gives them a better overview of the context and phases of decision-making preparation. On the other hand, interpretation of information increases the decision-maker’s understanding of the quality of offered knowledge and its production methods. For instance,

²⁵ See Kaaronen 2016.

²⁶ Scientific expert panels may have different operating models. In them, the production and transfer of knowledge and the collective interpretation of knowledge may appear in different proportions (see Kaaronen 2016).

Example 4.**THE FORUM FOR ENVIRONMENTAL INFORMATION BUILDS INTERACTION BETWEEN RESEARCHERS AND DECISION-MAKERS**

The Forum for Environmental Information,²⁷ operating in Finland, promotes the use of scientific knowledge on the environment.

The forum improves the availability and impact of environmental research by various means, such as publishing a series of articles that compile and summarise research around certain environmental themes. To improve the interaction of the producers and users of knowledge, the forum organises events that are based on dialogue between researchers, civil servants and decision makers. The forum also promotes public discussion about topical environmental questions by communicating actively between the events, too.

The Forum for Environmental Information is a non-profit organisation, with both producers and users of environmental information represented on its steering group. Operations are financed by Maj and the Tor Nessling Foundation and the Kone Foundation.

researchers seldom know exactly what kind of knowledge decision-makers need and at which phase of the decision-making process it is needed. The goals of decision-makers cannot easily be articulated as research questions that would be meaningful from the point of view of researchers and knowledge needs are often not identified early enough. Research has shown that a lack of a common basis for communication that results from these differences in operating cultures and perceptions of knowledge can be reduced by increasing encounters.²⁸

Although the interpretation of information and information needs promotes the building of understanding between different parties, it does not present its own conclusions of the information offered. A difference must be made between making sense of and interpreting knowledge. In interpreting knowledge, the challenge is to find a balance between precise presentation and understandable presentation. Knowledge must be presented neutrally but also with an understanding of the needs of different target groups.

Typical features of this approach include, among other things, finding relevant experts and decision-makers, bringing them together regularly and creating shared language and understanding. Examples of practices include meetings of researchers and politicians, mentor pairs, science sponsors and networking.

When information needs to be interpreted from many different points of view, networks and interaction become an element that is as equally important as the information itself. For instance, interpretation strengthens the expert networks needed by decision-makers and their ability to identify required fields of expertise.

While the approaches that assess alternatives and synthesise knowledge feature a clear boundary between knowledge and decision-making, interaction that interprets the points of view of both parties turns this boundary into a dynamic one.²⁹

The three types of practices mentioned above (assessing alternative options, knowledge synthesis and the interpretation of information and information needs) that connect knowledge and its producers and users have some common characteristics. First, the production and use of knowledge are seen as somewhat separate domains.

Second, the practices emphasise the competence and reliability of the parties that use them. People doing the connecting are required to have both expertise in decision-making contexts and the topics at hand and an ability to assess points of view, evaluate and compile knowledge and communicate it to decision-makers in a format that makes it possible for decision-makers to familiarise themselves with it and to grasp the essential points.

²⁷ Further information: www.ymparistotiedonfoorumi.fi/english/.

²⁸ See, for example, Cvitanovic et al. 2017.

²⁹ Turnhout ym. 2013.

Example 5.**KORSHOLM'S DELIBERATIVE PEOPLE'S FORUM HELPS VOTERS**

In referendums, people may feel that it is difficult to find reliable or impartial information about the questions they are voting for. A solution to this is a deliberative people's forum that evaluates the voting options and is realised according to the deliberation forum principles.

Korsholm is a municipality located on Finland's west coast, next to a larger city. Korsholm held a people's forum to support the indicative referendum on a municipal merger. A total of 1,400 randomly selected inhabitants of Korsholm were invited to the forum. From those who responded to the invitation, 21 forum members were selected, ensuring that the composition of the forum was in line with Korsholm's population structure. The forum heard politicians and experts on facts and points of view related to the municipal merger and forum members were provided with materials associated with the merger. In addition, the forum members were presented with statements that supported the views for and against the municipal merger, after which the members assessed whether the knowledge provided was relevant for the voters and reliable. Finally, the forum refined and supplemented the statements.

The final outcome of the forum's operations was a declaration for all inhabitants of the municipality. It did not take a stand on what might be the correct decision in the referendum; instead, its aim was to help voters to contemplate the decision from different points of view. The process was facilitated by a project funded by the Strategic Research Council, operating under the Academy of Finland, which strengthened the impartiality and legitimacy of the process.

Often, this kind of "knowledge support" is also associated with the ideal of an "honest broker", according to which the broker must be impartial and promote overall interests in the eyes of all process parties.

The practices described above differ especially in their relation to democracy and expertocracy. The significance of democracy is underlined in the practices that assess alternative options. In this case, people may be heard through their representatives or open hearing procedures or opinion polls. On the other hand, the practices that synthesise knowledge highlight expertocracy as their purpose is usually to compile the best available expert knowledge. In this case, the role of citizens is mainly to facilitate the compilation of knowledge required in decision-making. The interpretation of information and information needs operates in the space between democracy and expertocracy.

Opportunities offered by digitisation can be utilised especially in opening and transferring information materials and increasing the efficiency of the search for relevant information, as well as in the modelling and analytics that combine various kinds of data. Advanced data analytics can offer new means to identify connections between various types of data. Furthermore, digital platforms can be used in organising diverse open hearing sessions and also in crowdsourcing the collection of information.

3. Engaging knowledge use builds understanding and solutions through co-operation

Evidence is an important element in good decision-making, as are well-functioning expert networks and versatile interaction between producers and users of knowledge. When it comes to wicked problems, evidence and consequently knowledge-based decision-making is far from being unambiguous. Already by definition, the best knowledge about wicked problems is always deficient, open to interpretations and quick to become outdated. The problems themselves may also be vague and difficult to grasp. There is no single solution to be found for wicked problems; instead, one needs to return to them over and over again to address the constant change and tensions between different interests.

The management of wicked problems emphasises the management of complex wholes. Societal use of knowledge must be capable of offering useful approaches and arenas for the collective sense-making of diverse and multisource knowledge and the development of solutions. Knowledge is not only shared or compiled but also constructed interactively. This means that, compared to the practices that transfer or connect knowledge, in the engaging knowledge use, the strict boundaries between knowledge production, people's participation and decision-making become more vague or even partially merge.

Example 6.**HACK FOR SOCIETY INCLUDES
DECISION-MAKERS IN THE DESIGN OF SOLUTIONS**

The Hack for Society concept³⁰ increases dialogue between political decision-makers and researchers, the exchange of information and shared problem-solving. A meeting place is built for researchers, students and decision-makers, enabling them to develop concrete solutions to locally significant social challenges in co-operation with other stakeholders and participants.

In a month-long intensive and facilitated co-development process, teams comprising different parties compete in solving societal challenges that have been determined in advance. At the same time, participants accumulate learning about co-development, fast experiments and design thinking as tools in problem-solving.

The first Hack for Society challenge was carried out in autumn 2017 in Helsinki. In 2019, the concept is being tested at both municipal and regional levels in Finland.

A. Co-operative solutions

When the problem at hand involves both diverse knowledge and many different needs and interests, solutions should be developed through co-operation between different parties. If academic and political knowledge take precedence over experience-based knowledge and the expertise of practical implementers in questions of a societal nature, for instance, the outcome may be an efficiently prepared decision that does not work in practice. Instead of finding “correct” evidence, the more relevant question is how various types of knowledge (research-based knowledge, experiences, local knowledge, etc.) and values can be brought together in a useful manner, for collective deliberation and use.

In this case, what is important in the use of knowledge is to bring together the parties relevant to the problem at hand and to plan and facilitate an interaction process aimed at collective problem-solving. The key terms and words include “framing the problem”, “collective deliberation of options”, “co-operation” and “solution”. Applicable methods include, among other things, deliberation, co-development, service design and other design, challenge prize competitions, conflict arbitration processes and social experiments.

Interest in different co-development and co-creation practices has been great during the past decade. As easy-to-use digital platforms have become more common, the inclusion of citizens in societal decision-making and

service production has become easier. The global success of technology giants relying on user-driven expressions of opinions and co-production has also created pressure for stronger inclusion of citizens. At the same time, increasing individualism in society has lowered hierarchies and changed the societal position of experts. It has become increasingly acceptable to distribute responsibilities to people other than experts.³¹

Despite great opportunities, there are a lot of open questions associated with new digital forms of co-development. How does one create motivation for participation? How does one prevent participation from being a matter only for those people who are already active and digitally capable? Does one truly dare to share power in a new way or are the new forms of participation reduced to trendy supplements of the representation-based system? Technology is not neutral either. The structure of digital platforms influences the resulting forms of participation, how the problems are framed, the composition of participants and so on. All these aspects must be taken into account in planning.³²

**B. Understanding through
collective sense-making**

When dealing with a wicked problem, decision-makers may have very different perceptions of the problem and, as a result, it may be difficult to reach an agreement on solutions.

³⁰ Further information: www.sitra.fi/en/projects/hack-for-society/.

³¹ Brandsen et. al. 2018.

³² Lember 2018.

Example 7. SWEDBIO BUILDS A SHARED KNOWLEDGE BASE, TRUST AND COLLECTIVE INTERPRETATION

SwedBio³³ is a knowledge and decision-making interface that focuses on the protection of biodiversity and aims at the improvement of dialogue between various types of knowledge. In its operations, local and indigenous knowledge is combined with scientific knowledge that already has established processes for its use in decision-making.

One of SwedBio's operating models is a series of dialogues that brings diverse parties and evidence together and aims at surpassing obstacles that are caused by different language and background factors in different knowledge communities. The dialogue begins as early as the joint process planning phase. Dialogues are professionally facilitated, and their results are reported respecting the participants' anonymity.

SwedBio operates at the Stockholm Resilience Centre. The dialogue method has been used in Ecuador and Thailand, for instance. The method has been documented and its functionality and impact have also been assessed. The outcomes include, among other things, new approaches to financing the protection of biodiversity and recognition of the use of indigenous people's cultivation methods.

In this case, it is important to bring together different kinds of expertise for understanding the phenomenon at hand in its entirety and interpret different types of knowledge and points of view associated with the phenomenon.³⁴ The goal is that interaction helps to expand the cognitive and mental frames of each process participant's thinking in a manner that benefits later decision-making.

In this approach, key terms include the understanding of the phenomenon and related dilemmas, the increase in understanding and the collective sense-making of knowledge. Applicable methods include, among other things, dialogue processes,³⁵ interactive monitoring of the situation³⁶ and societal decision-maker training.³⁷

A carefully planned and prepared dialogue is a particularly useful method for understanding phenomena and broadening one's thinking.³⁸ In dialogue groups, the topic at hand is often discussed as a single whole, enabling all participants to bring their points of view into the

dialogue. In wicked problems, knowledge is relative and contextual. In this case, a dialogue approaches the topic from different contexts and identifies connections between different contexts and may offer an opportunity to build a better understanding of the whole.³⁹

Instead of being representation-based, the best dialogue groups are formed of people with differing opinions and complementary skills and ways of thinking who share a common goal. Another essential aspect of diversity is the quality of interaction it produces.⁴⁰ For instance, the Timeout concept⁴¹ developed by Sitra offers tips and develops dialogue facilitation skills.

Data analytics and artificial intelligence may also offer new means to identify such connections between different points of view that the participants would not have thought of within their own cognitive frames. Collective sense-making of results from data analytics may make the participants' assumptions and mindsets more visible.

³³ Further information: Jousilahti et al. 2019, <https://swed.bio>.

³⁴ Ks. Lehtinen 2018.

³⁵ Ks. Hellström 2018.

³⁶ For instance, phenomena maps on dialogical co-planning are a way to structure the phenomena being reviewed. Sitra has published tools for understanding phenomena and for phenomena-driven planning – see Sitra 2018a and 2018b. See also "Context maps" in Carleton et al. 2013.

³⁷ For instance, the National Defence Courses, Sitra's leadership training for sustainable economic policy and the Forest Academy for Decision-Makers.

³⁸ See. Hellström 2018.

³⁹ Nora Bateson, founder of the International Bateson Institute, has developed a new data concept, Warm Data, that is particularly well suited to the dialogical addressing of complex phenomena. Warm Data refers to inter-relational information about phenomenon-related contextual interactions. See <http://internationalbatesoninstitute.org/warm-data/>.

⁴⁰ Lehtinen 2018.

⁴¹ See sitra.fi/en/timeout.

Consequently, the role of data analytics is not to replace interaction but to support it.⁴²

The practices of collective sense-making are needed especially when tackling major, long-term societal challenges. They are particularly useful when the aim is to ensure that decision-making and its preparation are targeted at the right problems and that the related connections between different matters, as well as values and interests, are identified in as versatile a manner as possible, which increases the effectiveness of decision-making.

* * * *

In engaging knowledge use, knowledge producers and citizens do not only offer knowledge and points of view to support decision-making: at its best, they become decision-making partners who challenge each other's self-evident assumptions and introduce a broader view of the problem to be solved.

Often, engagement processes are organised separately from decision-making, after which the resulting summary, recommendation or other output is only transferred to decision-making, in a manner typical of the linear use of knowledge. However, engaging knowledge use works best when key decision-makers also participate in the collective process of constructing knowledge. This broadens their understanding of the problem or involves them as a part of the solution. The participation of a decision-maker does not transfer their decision-making power to the engaging process; instead, it improves their understanding of the problem and their capability of making decisions that take different points of view into account.

The effectiveness of engaging knowledge use is based, among other things, on building trust, finding the right participants and strengthening their motivation. The processes often require time and resources and also a certain degree of institutionalisation. One key challenge is to create incentives for different parties to participate, while another is to convince the users of knowledge and decision-makers that, regardless of the time and resources required by the approach, it may be the best option in the long term. The challenge is related to the societal decision-making timespan, in which even complicated questions often require quick solutions.

With engaging knowledge use, power structures and value conflicts are present in the interaction between different experts and decision-makers. In this way, the political activity dimension included in societal decision-making is turned into a visible and legitimate dimension of the discussion. If engaging knowledge use can produce understanding stemming from pluralism, it commits the participants to the realisation of changes and facilitates the implementation of decisions. When successful, well-executed engagement helps to develop the ability of the participants to take part in political processes. Consequently, good planning of knowledge-use processes can simultaneously strengthen the legitimacy and quality of decision-making.⁴³

In engaging knowledge use, the interactive participants' own cognitive frames and the interpretation of knowledge strongly guide the flow of discussion and the formation of proposed solutions. The challenge of group processes is that individual-level biases may become even more intensive in a group. Attention must be paid to these biases of group thinking when selecting the participants and when applying interactive methods.⁴⁴

Different approaches can support and supplement each other

According to a famous quotation from statistician George Box, all models are wrong, but some are useful. Indeed, the approaches described above are ideal types. In practical everyday decision-making and preparation, they are not always feasible, sensible, productive or clearly distinguishable.

Methods that are applied in practice may contain characteristics from several different approaches and different methods are not mutually exclusive. A single decision-making preparation process may include, depending on the perspective, several different phases, in which different approaches and practices related to the use of knowledge follow one another. They can also be carried out in parallel or even in a partly merged form. In Finland, for instance, many projects within strategic research carried out by the Academy of Finland and projects conducted by the Government's analysis, assessment and research activities also include practices that strengthen interaction between experts and decision-makers in different fields as well as co-development of knowledge or solutions.

⁴² See Takala 2018.

⁴³ See Rask and Ertiö 2019.

⁴⁴ See Lehtinen 2018.

4 TAKING KNOWLEDGE-USE COMPETENCE TO THE NEXT LEVEL

Those responsible for making preparations for decision-making must be familiar with different approaches to knowledge use and know how to justify the choices made and plan the processes associated with it in a way that best suits each situation. Managing wicked problems in particular benefits from approaches to knowledge use being chosen and processes being planned in co-operation. The engaging approaches suitable for dealing with these problems require new kinds of interaction skills from both process designers and those taking part in the processes. Consequently, competence associated with knowledge use is not only about individuals' competence but also about team competence.

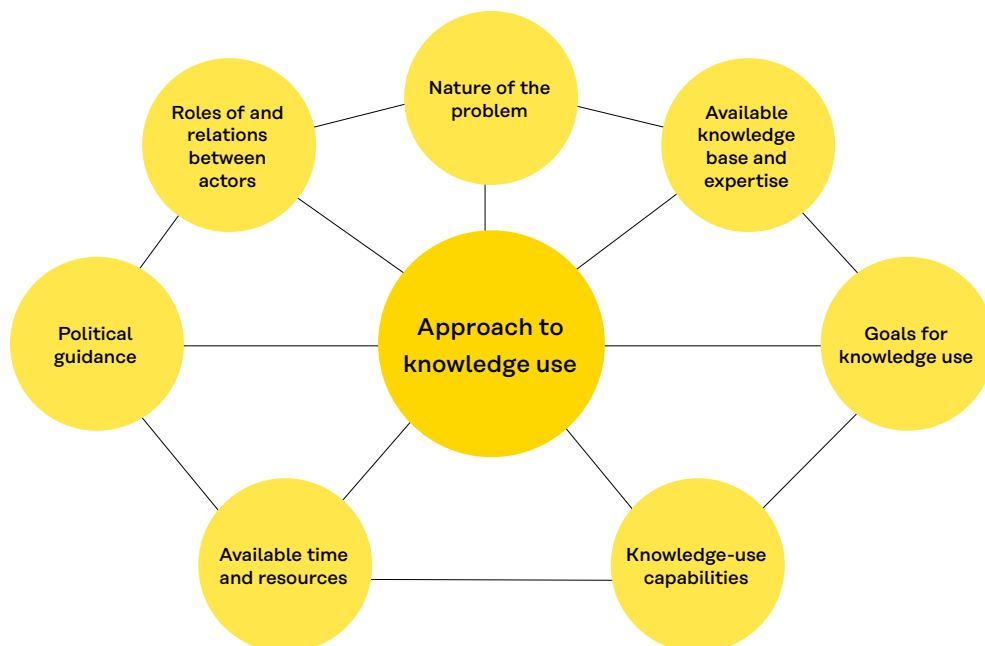
One must know and justify different approaches

The better the suitability of the use of knowledge to the situation at hand, the better the success of societal decision-making. The ways of using knowledge must be compatible with the nature of the phenomena or problems concerned, the phase of decision-making and known restrictions. This includes, for instance, available time,

resources, knowledge base and expertise, the roles and relationships of different parties and political guidance.

As a result, the choosing of the approach to knowledge use and the planning of processes require extensive insight into different situation-specific factors, an understanding of practices that are best suited to different contexts and an ability to justify the advantages and disadvantages of choices made. This kind of competence is also needed

IMAGE 2. POINTS OF VIEW TO BE TAKEN INTO ACCOUNT WHEN CHOOSING THE APPROACH TO KNOWLEDGE USE



SITUATION-SPECIFIC FACTORS INFLUENCE THE CHOICE OF PRACTICE

A practice that is well suited to knowledge use in one situation is not necessarily suitable in another situation due to the different nature of the problem, different goals or different pragmatic policy restrictions.

It is important to identify **the nature of the problem** because in simple problems it is not a useful option to launch an extensive, facilitated knowledge creation and use process – sometimes a well-prepared report by an investigator may provide an equally good outcome. Sometimes the wider whole is not understood when a study that was ordered for resolving a relatively complicated problem only scratches the surface of the problem.

The goals for knowledge use also vary depending on the situation. The appropriate approach to the use of knowledge may differ depending on its goal: the definition and framing of the problem, the search and compilation of knowledge, the achievement of a joint decision, the building of trust, the arbitration of conflicts, the improvement of capabilities or the development of solution options.⁴⁵

An available knowledge base and expertise have an essential impact on the practice to be chosen for creating and using knowledge. If the problem or the way to understand it is new, there may not necessarily be any relevant scientific evidence available. Other potential challenges include the abundance or inconsistency of information. There are also other essential factors: to what extent it is possible to use documented knowledge? What knowledge is most readily available from subject matter experts or parties involved in practical work? What kinds of opportunities are there for applying data analytics? And what elements of knowledge creation are worth crowdsourcing?

Available time and resources are the most typical restrictions on knowledge use. Often it

is expected that quick answers are found within a very limited budget. However, when it comes to complicated and wicked problems, there is the risk that the problem may be framed too narrowly and that various knowledge-based perspectives that are required for solving the problem are ignored. Depending on the situation, it is absolutely possible that increased engagement may make decision-making slower and heavier; on the other hand, one good dialogue event may in some cases be a quicker and more streamlined way to gain a sufficient overview of the phenomenon at hand than extensive investigation.

Political guidance and the political nature of knowledge are facts in societal decision-making. However, power associated with knowledge use can be made visible by increasing openness about the knowledge that has been used to support decision-making, about which methods it has been acquired and about how it has influenced decision-making. For instance, the use of research-based knowledge in law drafting often remains invisible as a result of inadequate documentation.⁴⁶ The documentation of the knowledge used improves the acceptability of decision-making even if it were a question of just background knowledge without a direct influence on decisions made.

Knowledge-use cultures are often different in different policy areas and administrations. For instance, attitudes towards different forms of knowledge and expertise, openness of knowledge and traditions in the interactive creation of knowledge, as well as connections to stakeholders, may be different to begin with.

Knowledge-use capabilities and perceptions related to the use of knowledge often have an ultimate impact on the choosing of the approach. For instance, if the prevailing perception of knowledge is linear-mechanistic, it may be difficult to identify the need to engage knowledge creation and use. Furthermore, if the ability to identify various alternative knowledge-use methods and apply them in practice is inadequate, one may easily rely only on customary knowledge-use models.

⁴⁵ Jousilahti et al. 2019.

⁴⁶ Nieminen et al. 2019.

Example 8.**CO-OPERATIVE PLANNING OF KNOWLEDGE USE IN THE TOIMI PROJECT⁴⁷**

The basic social security and activity reform project (TOIMI), led by the Finnish Prime Minister's Office, has supported the preparation of an overall reform of Finnish social security together with parliamentary participants. The project used an exceptionally extensive and diverse range of approaches to knowledge use and transfer. The project used a phenomenon mapping tool in directing these functions.

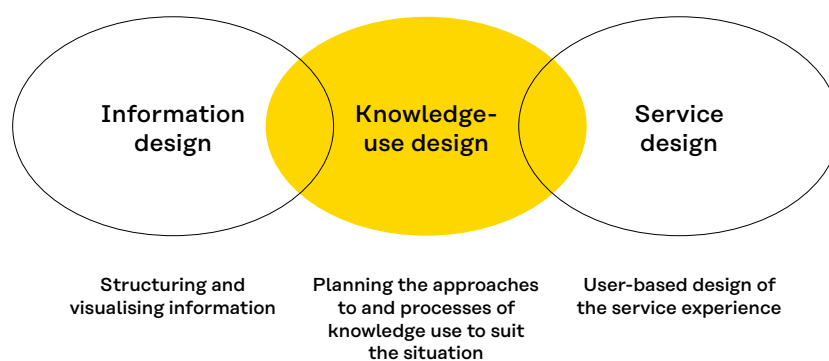
The phenomenon map was built by asking approximately 25 members of the parliamentary monitoring group the following questions: Which questions should the project answer? What knowledge is important in the social security reform? After this, the project's leadership team grouped the answers qualitatively under different topics so that related concepts were grouped according to the level of complexity. The phenomenon map was used both to build a shared situational picture and to plan knowledge acquisition and transfer processes.

because although some of the situation-specific factors may seem pre-set, they may be influenced, contested and reformulated during the process.⁴⁸

In far-reaching questions, the best way to plan the process of knowledge use is co-operation between the producers and users of knowledge. Indeed, the most suitable approach to the creation and use of knowledge should be chosen and its implementation planned so that producers of knowledge, policymakers and key stakeholders are all engaged in the process. In this case, the planning of knowledge use is not only about individuals' competences, but also the competences of teams and networks.

Co-operative planning of the processes of knowledge use requires that the participants are ready to not only offer their own special expertise but also to deliberate with others about how their expertise and competences could be connected optimally to those of others. In addition to utilising their own expertise, the participants must be able act as members of the team that is addressing the wicked problem.⁴⁹

The planning of knowledge use can benefit from the lessons learned from service design and information design. In this case, it can be regarded as a service that combines key characteristics from both information design and service design (see Image 3).

IMAGE 3. SERVICE AND KNOWLEDGE DESIGN'S CONTRIBUTION TO KNOWLEDGE-USE DESIGN

⁴⁷ See Jousilahti et al. 2019.

⁴⁸ See, for example, Saarela, Söderman and Lyytimäki 2015.

⁴⁹ See Karner et al. 2011.

The aim of **information design** is to present information in a manner that enables its efficient absorption. The concept is closely related to information or data visualisation,⁵⁰ for instance. The increasing use of infographics in the transfer of knowledge is an indication of the rapidly growing popularity of information design. This has also resulted in the emergence of a new occupation. For instance, the Government of Finland has lately been recruiting information designers to improve the efficiency of knowledge transfer. The popularisation of knowledge and turning it into a narrative format can also be regarded as forms of information design.

Service design is user-driven design of the customer's service experience in a manner that ensures that the service fulfils the users' needs and the service provider's goals. It pays particular attention to the places where the customer and the service meet and to building a service journey for the customer on the basis of these encounters.

Knowledge-use design can be considered a hybrid of information design and service design, where the object being designed is the knowledge-use approach and process suitable for the user situation in question. The goal is an operating model that takes into account the needs of knowledge producers, people's participation and decision-making.

The capabilities of engaging knowledge use must be strengthened

Developing the capabilities related to knowledge use often emphasise the skills needed in transferring knowledge, making it understandable and improving the balance of knowledge supply and demand (cf. transferring and connecting use of knowledge).⁵¹

The higher the complexity of the phenomenon to which societal decision-making is related, the higher the diversity and demands related to the use of knowledge is. A bottleneck that emerges, especially in the implementation of engaging approaches suitable for managing wicked problems, is the lack of competence related to these practices. In the following, we take a look at the capabilities required by the engaging knowledge use and creation.⁵²

Many of the capabilities described below are shared by those who plan and implement engaging processes and by all interaction process participants. It is, first and foremost, about the skills of teams and networks.

1. Forming the situational picture. Knowledge compilation and synthesis are important tasks when the boundaries of the phenomenon at hand can be defined clearly and the abundance of knowledge can be managed. However, when it comes to wicked problems, this is not enough. Instead, different kinds of knowledge, challenges and goals must also be put into proportion and connected to each other. The ability to contextualise and manage the diversity and inconsistency of knowledge and goals are emphasised. In the practices typical for engaging approaches to knowledge use, knowledge is interpreted through interaction between knowledge producers, decision-makers and other participants, so connections are created not only between the issues but also between people and their points of view. Transparency and openness are the basic characteristics of this kind of co-operation because they create mutual trust among participants and opportunities for people and institutions that monitor the process to understand the ways in which the challenge is managed.

⁵⁰ Although the information design conventions are firmly rooted in visual design, the concept of information design has also become a kind of synonym for information architecture in connection with ICT operations. See, for example, the Government report on information policy and artificial intelligence (Government of Finland 2018).

⁵¹ In spring 2018, the OECD and the European Commission's Joint Research Centre (JRC) organised a workshop, in which several experts determined what kind of capabilities civil servants are required to have in relation to evidence-informed policymaking (see OECD and European Commission 2018). The capabilities identified were typically related to the ability to order reports, read and process knowledge and data, make syntheses, interpret knowledge and assess its quality and restrictions. In addition, the understanding of decision-making contexts and processes as well as capabilities associated with knowledge asset and innovation management and the assessment of policies are often emphasised. When it comes to the engagement of different parties, the aspects that are especially highlighted are understandable communications, the management of expert networks and the crowdsourced production of knowledge. Digitisation is considered to create new competence requirements in particular when it comes to information security and digital communications.

⁵² When structuring different capabilities, we referred to the division of skills developed by the European Commission's Joint Research Centre (JRC) (see Topp et al. 2018). However, we apply and interpret the division loosely. Instead of focusing on the competence needs of knowledge producers, we approach the capabilities from the point of view of decision-making and especially from the perspective of wicked problems and engaging knowledge use.

2. Encountering uncertainty. Imperfections and uncertainties resulting from a lack of knowledge or inaccurate knowledge, and from the fact that politics is based on values, are an essential part of societal decision-making. However, there are more profound sources of uncertainty associated with the many wicked problems faced by society today. It is not often possible to reach consensus on wicked problems and problems cannot be solved in their entirety in one go, if ever. As time goes by, the same challenges re-emerge in different ways and with different emphases. Working with wicked problems requires tolerance of imperfection and uncertainty. The constant commitment of different parties needs to be ensured and the “muddling through” attitude, typical of solution-oriented activities, needs to be applied: the overall goal has been defined and understood but the steps leading there are, at their best, simply steps forward with gradual, cumulative effects. The paradigm shift to problem-solving in which the method is determined along the way still requires getting used to. Both knowledge producers and decision-makers need to learn to process this uncertainty.

3. Monitoring and assessment. By monitoring and assessing the impact of knowledge, its consideration in decision-making can be improved. Nevertheless, wicked problems and the engaging approaches to knowledge use require placing a new kind of emphasis on monitoring and assessment. They are important not only for proving the impact of knowledge but also for reflecting on one’s own actions. Self-reflection is needed because the constant mutation that is typical of wicked problems requires the constant updating of the situational picture⁵³ and the development and experimenting of new practices. When it comes to the engaging approaches to knowledge use, it is also extremely important to monitor and assess the functionality of interaction processes and their applicability to different situations.

4. Building networks. Researcher and expert networks and communities play a key role in the transfer of knowledge. Well-functioning networks enable the quick identification of knowledge and expertise needed for each particular situation. Networks also make it possible to form an interdisciplinary overview of the phenomenon at hand and offer it to decision-makers. However, with wicked problems, “ownership” and expertise do not belong to the

producers of scientific knowledge alone. Engaging knowledge use involves many other experts, brokers, stakeholders and decision-makers, too. Network competence needed in the engaging approaches must be seen more broadly as the skill of maintaining and developing social networks or even social infrastructures.

5. Citizen and stakeholder engagement. When managing wicked problems, methods that ensure the broad engagement of stakeholders and citizens become increasingly significant. In the practices based on engaging knowledge use, citizens and stakeholders are not only producers of knowledge and providers of expertise but also participants in the collective interpretation of knowledge and the development of solutions. In this case, engagement improves the impact of knowledge, the coverage of several points of view and commitment to solutions.

6. Understanding different worlds. Often it is emphasised that the solidification of the status of knowledge in decision-making requires that knowledge producers in particular have a better understanding of political and central government processes, the roles of different parties in these processes and the significances and rhythms associated with different process phases. On the other hand, people engaged in politics and administration should understand the ways of working and rhythms of the world of research. This need becomes even more acute when working with wicked problems as research results may naturally include inconsistencies or uncertainties. Topical challenges associated with wicked problems and their management methods and processes are also constantly changing. This requires that the participants dealing with the challenge need to review the situational picture constantly. Engaging knowledge use also requires understanding related to a more extensive knowledge environment, such as the interface with stakeholders and citizens and development in the field of data analytics.

7. Communications and counselling. Communications that take the needs of the target groups into account is an essential part of all transfer of knowledge. In addition to scientific communications, another recurring topic of discussion is scientific counselling. It helps decision-makers identify different policy alternatives and their potential effects and provide decision-makers with advice and recommendations based on a scientific

⁵³ For information on opportunities to support a constant monitoring of the situation with data analytics, see Takala 2018.

perspective. Engaging knowledge use also demands an ability to understand the significance, content and quality of different types of knowledge and take them into account. When decision-makers are engaged in interaction that interprets knowledge or develops solutions, counselling that is integrally linked with transferring or connecting knowledge use and targeted at decision-makers becomes less significant. However, this does not mean that less knowledge is transferred, but that decision-makers participate more actively and interactively in the discussion about the characteristics and possible uses of available knowledge. In addition, the adoption of the engaging approaches requires an ability to justify the choosing of the approach to those who are responsible for decision-making preparations and to motivate the participants of the engaging processes.

8. Interaction skills. Decision-making is fundamentally about an ability to solve problems in interaction with others. Good interaction demands emotional skills, teamwork skills and flexibility. The engaging practices for knowledge use are not only about one's ability to interact with others but also about one's ability to guide group members towards new ways of thinking and acting and to get group members to interact with one another. This requires facilitation skills.

5 THE WAY FORWARD

Finland is considered to be a pioneering country in research, education and good governance. Finland has everything it takes to show the way in using knowledge as the basis of societal decision-making, too. This is not yet the case because thus far the use of knowledge has been developed in silos and lessons learned in one silo do not spread easily to other silos. Societal decision-making cannot manage the wicked problems ahead of us without the strategic development of knowledge use throughout the entire public sector. We conclude this working paper by presenting four development principles that can serve as a foundation for continuing this pioneering work – in Finland and elsewhere.

Knowledge use is developed in silos in Finland, too

For a small country like Finland, it is particularly important to be able to forecast and respond to changes in the operating environment. Our way of creating and using knowledge in an increasingly multidimensional information environment and an arena of competing values and interests is key to Finland's future. The carefully considered use of knowledge that combines diverse types of knowledge and competence and the use of new practices stemming from engagement and digitisation may turn Finland into a pioneer in the use of knowledge. The prevailing ways in which the use of knowledge in societal decision-making in Finland has been organised and how these ways are developed are not enough to respond to the challenges ahead of us. Development has been carried out in silos and lessons learned in one silo do not always spread easily to other silos.

When talking about knowledge use, there is a wide range of **concepts and frames of reference** and no generally shared frame of reference for knowledge use in

societal decision-making. The use of knowledge is approached with the aid of the concepts and theories of knowledge management, knowledge asset management, knowledge-based management⁵⁴ for instance. Means of knowledge asset management may include knowledge support, IT administration or information services. The frames of reference also vary depending on whether activities serve decision-makers' individual knowledge needs, societal decision-making or the use of knowledge as support for an organisation's management and operations, for instance. However, knowledge asset management, knowledge policy or decision-making knowledge support are empty concepts if their use context is not defined clearly enough.

Lack of **competence** and thin developer networks were reported as being some of the key obstacles to the development of the use of knowledge in a survey⁵⁵ conducted by Sitra in summer 2017. The survey questionnaire was sent to both knowledge producers and representatives of administrations and targeted at developers working at the interface of knowledge and

⁵⁴ Knowledge management is a rather new field of management, built on the idea of the significant role of knowledge in the success of organisations. Knowledge management only appeared in discourse in Finland in the 1990s and related concepts have not yet become firmly established.

In this working paper, we consider knowledge use in societal decision-making to be most closely linked to the concept of "knowledge-based management". With this concept, Laihonen et al. (2013) refer to operating methods that promote the creation, organisation, sharing and application of knowledge and the supporting structures and technologies. Knowledge-based management also includes the use of the tacit knowledge that experts have gained through experience.

For differences and similarities between knowledge-based management, knowledge asset management and knowledge management, see Laihonen et al. 2013.

⁵⁵ Hellström and Ikäheimo 2017.

decision-making. Participation in knowledge-based management training was extremely rare among the respondents and only half of them read publications or articles on the topic being handled. Individual competence was mainly developed through discussions and exchanging experiences with colleagues.

Decision-making related to wicked problems in particular needs new, co-operative and interactive approaches that bring together a diverse range of knowledge and people. Their more extensive adoption requires competence in both interaction methods and practical facilitation.⁵⁶ Lack of capabilities in exactly these areas⁵⁷ has often led to various interaction processes being outsourced to service providers instead of their implementation skills being developed as public

Decision-making related to wicked problems in particular needs new, co-operative and interactive approaches that bring together a diverse range of knowledge and people.

organisations' strategic capability. However, in successful outsourcing, the outsourcer must know how to determine the suitability of the service being ordered to the situation in question. In addition, although many different kinds of engaging practices are already being developed, they are often left undocumented and, as a result, it is difficult to learn from examples and scale successful operating models.⁵⁸

There are several political sectors within **Finnish government** that are closely linked with the development of the use of knowledge. In these sectors, knowledge-based management, administrative openness and engagement and the use of digitisation and data analytics, for instance, are

developed as fairly separate areas. The development of different practices for knowledge use is also concentrated in different administrative branches. In addition, the responsibility for knowledge use that is based on various forms of knowledge production is divided between different parties. It seems that no party has an overall picture of the development of the use of knowledge. The co-ordination responsibility for knowledge use development has not been defined clearly either.

Within administrative branches, the use of knowledge in decision-making has not been organised consistently either. Each administrative branch and political sector has their own basic assumptions, perceptions of knowledge and cultures related to knowledge asset management and knowledge-based management. Depending on the administrative branch, the responsibility for the use of knowledge in decision-making may be part of the development of administration in the administrative branch, policy planning, information services, statistical and analysis services, research activities or IT administration, for instance. The overall development responsibility for knowledge use in decision-making may be undefined or the party responsible for it is difficult to identify.

At its best, the work of **the Parliament** and the government in legislative processes forms a continuum, in which knowledge collected in one place also benefits the next phase of the process. However, the knowledge-related practices of Parliament and the government do not share a synergy in legislative processes.⁵⁹ Furthermore, knowledge-based decision-making, digital knowledge-use solutions and democracy processes are often developed too separately from one another.⁶⁰

Four directions to the future

The development of knowledge use requires a development leap transcending the entire public sector. In a complex world, the use of different types of knowledge cannot be managed or developed separately. The organisation of knowledge support should not be divided into tasks

⁵⁶ See Sitra 2018.

⁵⁷ Hellström and Ikäheimo 2017.

⁵⁸ For Sitra's analysis of interactive forms of knowledge brokerage suitable for processing complicated problems, see Jousilahti et al. 2019.

⁵⁹ In March 2019, the Parliament launched a project for developing knowledge support for its decision-making. In its work, the aim is to take also the synergy opportunities between the Parliament and the Government into account.

⁶⁰ Different countries have created solutions relying on new information and communications technology, with the aim of increasing people's engagement and participation opportunities. This has not crucially changed how democracy works but mainly brought new practical operational opportunities in its existing forms (Hyssälä and Backman 2018).

distributed among IT administration or information or research services, for instance, without the synergic development of the entire whole formed by these services.

Lack of resources and financing is often considered a key obstacle to the development of knowledge use as support for decision-making. However, a lack of resources is not the fundamental reason for a scarcity of development activities; instead, this scarcity is a reflection of the insufficient strategic weight of knowledge-use development in our society. The use of knowledge as support for decision-making does not succeed in responding to the challenges ahead of us without a strategically guided and led change.

As a starting point, we present the following four key development principles: 1) the development of knowledge use must be led strategically and synergistically; 2) the practices for knowledge use must be brought up to date; 3) competence associated with knowledge use must be developed in a determined manner; and 4) extended perspectives and extensive incentives must be used to strengthen the impact of research. Only by relying on these principles can we ensure that the use of knowledge as support for decision-making becomes a future success factor.

1. The development of knowledge use must be led strategically and synergistically

Knowledge use in societal decision-making must meet increasingly diverse expectations. This requires a more ambitious approach to knowledge-based management and its development. It is not a question of developing a support service for decision-making or administration but of creating an essential element of future-oriented leadership.

It would be especially important to pay closer attention to the connections between knowledge-based decision-making, the development of democracy practices and data-driven information policy. All of these essential sectors of knowledge use are largely developed separately. However, it is difficult to create synergies unless the strategic significance of knowledge use for the development and management of public administration is recognised. A responsible party or a high-level forum should be assigned for the alignment of development activities carried out in different administrative branches and substance sectors.

The development of knowledge use should be set as a goal that transcends the entire public sector, from the Government programme to different research, education and innovation policy guidelines. These documents should pay particular attention to the new kinds of challenges

arising from wicked social problems and the approaches needed for managing them.

2. Knowledge use practices must be brought up to date to tackle future challenges

The situation-specific approach to knowledge use should be taken into account in all decision-making preparations. The planning of knowledge-use processes and the choosing of the practices best suited to the situation should be a standard phase in decision-making preparation. This is particularly important in the major strategic and phenomenon-based questions that are discussed in the Government programme.

In decision-making, enabling the choosing of the most suitable approach to knowledge use requires that the allocation of resources to knowledge use must be reviewed from a more extended perspective and over a longer term. Especially when it comes to extensive phenomena and wicked problems, there must be time in decision-making

The use of knowledge as support for decision-making does not succeed in responding to the challenges ahead of us without a strategically guided and led change.

preparations to stop and contemplate the problem as well as the ability to consider various engaging approaches to knowledge-use. In the case of wicked problems, investments in the engaging practices pay themselves back in the long term if they succeed in creating a comprehensive understanding of the problem at hand, building trust between the parties and strengthening commitment to solutions made.

In addition, the application of the engaging approaches needed for managing wicked problems requires easily applicable practical methods. In particular, we need ways to bring various forms of knowledge and expertise to the same table in a way that strengthens engagement. Good practices should be adopted, documented, developed, maintained and shared.

3. Competence associated with the use of knowledge must be developed in a determined manner

The situation-specific use of knowledge does not succeed without the determined development of competence. The nature of problems and different decision-making situations must be read correctly. The suitability of different practices to different situations must be understood comprehensively and the processes of using knowledge must be planned through co-operation. What is also needed is an adoption and implementation ability, especially with regard to the engaging approaches to knowledge-use.

Training that increases competence associated with knowledge use must be strengthened as part of management and civil servant training provided by administrations, starting from the orientation training organised for new civil servants. Competence should also be developed in more agile manners than those available through traditional training. For instance, a mentor network that is thoroughly familiar with various knowledge-use practices and encompasses different administrative branches might offer assistance in identifying and adopting the most suitable practice for each situation.

Another aspect of decision-making that needs strengthening is the assessment of how suitable the approach to the use of knowledge has been to dealing with the phenomenon or problem at hand. By collecting experiences, it is possible to increase the understanding of the kind of practices that should be used in various situations in the future.

4. Extended perspectives and extensive incentives must be used to strengthen the impact of research

When the situation-specific use of knowledge is set as a goal of decision-making preparations, the impact of research-based knowledge must be understood from a new perspective.

The research community needs to understand more clearly that in a multidimensional information environment, the impact of research-based knowledge cannot be strengthened solely through better communications or by giving research an official status in decision-making. To be able to exert influence, the scientific community must reposition itself in relation to both engaging knowledge use and the world of data analytics that is more fast paced than the world of research. These

should not be regarded as challengers to or competitors of the scientific community but more as partners that can also contribute to the impact of science.

Support for academic career development and merit acquisition needs new incentives that encourage the scientific community's active co-operation with the processes of knowledge use in societal decision-making, regardless of its forms. It is not so much a question of changing the ways in which scientific research is conducted as a question of strengthening the role of academic expertise.

Afterword

Finland's latest Government programme, "Inclusive and competent Finland", published in summer 2019, contains guidelines that are significant from the perspective of knowledge use as support for decision-making and that focus on many of the themes discussed in this working paper (openness, involvement of different administrative branches, comprehensive perception of knowledge, broad knowledge base, extensive engagement, use of digital tools). These guidelines form a solid foundation for developing knowledge use.

However, the Government programme's promises about new kinds of interaction and knowledge-based politics cannot be fulfilled without significant investments in knowledge use practices and in the development of competence integrally related to their implementation. The strategic weight of the development of knowledge use must be strengthened throughout public-sector management. As new ways of working do not become established practices instantaneously, it is important that development efforts and the allocation of sufficient resources for them are continued in a determined manner across parliamentary terms.

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The project has recognised the challenges and opportunities associated with the changing relationship between knowledge and decision-making and introduced related new perspectives. In addition, it has tested and piloted new interaction models related to knowledge and decision-making and helped to develop existing practices for knowledge use, as well as establishing arenas aimed at interaction between knowledge and decision-making. The project has also enabled interaction between those interested in the subject and has shared good practices.

Further information: www.sitra.fi/en/topics/knowledge-decision-making/



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