

## **Interfaces between science and policy – Towards a better management of research funding programmes**

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**Policy-making uses among other things the knowledge generated by scientific research. The relationship between science and policy is, however complicated. Science and policy have different working cultures, aims and ways of communication, which poses a challenge to their interaction. This article discusses how research funding could promote the production of policy-relevant research knowledge and its use in policy-making. A study made within the SKEP ERA-Net is used as an example. Supra-national, jointly funded research programmes are also discussed. The focus of the article is environment-related research but can also be applied to research funding in general.**

The importance of research in encouraging competitiveness, innovation and welfare is recognised in the Lisbon strategy of the European Union. The strategy aims at promoting economic, social and environmental change in the EU member countries (European Commission 2005). Developing the European Research Area (ERA) is one part of the Lisbon strategy. It aims at joining resources of different countries to improve the coordination and focus of research and innovation activities in Europe. ERA-Nets are part of the EU's Sixth Framework Programme. They are networks of research funding agencies with the aim of promoting the creation of jointly coordinated and funded research programmes.

SKEP (Scientific Knowledge for Environmental Protection) is one of the ERA-Nets and gathers together 17 research funding agencies from 13 European countries. Members of SKEP are ministries, academies or institutions that fund environment-related research. SKEP aims to improve the quality of environmental research, encouraging innovation through more efficient use of research funding and creating joint research programmes between the partners ([www.skep-era.net](http://www.skep-era.net)). In this context there has been discussion on the interface between science and policy and how this interface should be taken into consideration in research funding. Also the different and changing definitions of the science-policy interface have been under scientific discussion (e.g. Sørensen 2002, Georghiou 2006, Guimarães Pereira et al. 2006).

The Finnish Environment Institute and the Finnish Ministry of the Environment jointly coordinate one of the six Work packages of SKEP. The Work package aims to recognise and share good practice in the management and evaluation of environmental research funding programmes. It also aims to rationalise and harmonise management and evaluation practices in different countries and seek ways in which programme management can support the use of research knowledge in policy-making (Furman et al. 2006). Written documents and interview material were analysed and two workshops were organised to gather together representatives of SKEP organisations and other experts in the field of research programme management, evaluation and science-policy interface. This

article discusses the challenges related to the interaction between science and policy and presents results gained from the project.

### **Challenges in the interaction between science and policy**

The relationship between science and policy is characterised by different working cultures and timescales. Research is typically slow, while policy-making often requires quick responses in a short timescale. Science is characterised by narrow specialisation and often strict borders between disciplines, while policy-making needs large-scale approaches and broad views. There are some conflicts of interest that complicate the interaction between science and policy: the scientific community does not always appreciate applied and interdisciplinary research as much as "pure" science. At the same time policy-makers call for more applied, problem-oriented and interdisciplinary research and do not necessarily see other kind of research as meaningful. Policy-makers expect a strong consensus and syntheses from the scientific community, while researchers do not necessarily have the motivation or possibilities to do such syntheses and build a consensus (e.g. Scott et al. 2005). Different perceptions of scientific knowledge may become an obstacle for effective communication on the scientific uncertainties that are included in complex policy issues as environmental problems (van der Sluijs 2006).

Uncertainty is a basic characteristic of science. The "final truth" is never achieved and new questions arise when answers to others are found. This is especially true when it comes to environmental research. Environmental issues are full of complexities and interdependencies, and solving environmental problems often requires simultaneous actions in several spheres of society. Because of uncertainties, political decisions have to be made based on imperfect knowledge.

Smits (2004) has used a monster-metaphor to describe the cultural domestication of technology. Van der Sluijs (2006) applies this monster-metaphor to scientific uncertainty and presents uncertainties as monsters that can be responded in different ways. For example, the "monster" can be rejected, its existence denied or there can be attempts to hide it. There may be unwillingness to reveal uncertainties in the interaction between science and policy, because of a fear that research containing a lot of uncertainties is seen as "bad research". Another reason for hiding uncertainties can be that there is not enough room for them in the political agenda (van der Sluijs 2006).

In the long run it may not be realistic to try to reduce scientific uncertainty. When science chops off one head from the "uncertainty monster", new heads tend to appear. It has been suggested that instead of aiming to reduce uncertainties and provide spuriously exact predictions, environmental research should rather have the objective to learn to cope with uncertainties and have control of them by providing reliable estimates on the probability and scale of certain risks. This would be more expedient from the point of view of policy-making and serve it better (Williamson 1994, van der Sluijs 2006). Dealing with uncertainties successfully in the interaction between science and policy requires openness and the acceptance of different views and pluralism in environmental issues.

It has also been proposed that the difference in languages used within science and policy causes a need for interpreters able to mediate research results to policy-makers and stakeholders in an understandable way. Results published in scientific publications are not always in a form that can be directly used in policy-making (Scott et al. 2005). More focused communication with different users of research knowledge is needed, and such "interpreters" may have an important role in promoting the use of research knowledge in policy-making. Interpreters can be either individuals, organisations or cooperation networks. Knowledge produced in research projects can then be "translated" in each research programme for the needs of politicians and civil servants.

### **How can research programme management support policy-making?**

When promoting research for policy-making it is essential to include policy relevance in all parts of a research programme. For example, this relates to who will participate and contribute at the planning phase of a research programme and which are the issues that steer the programme planning. Research programmes striving for policy-relevant research should also pay attention to how the policy dimension is included in the call for proposals and their evaluation in relation to criteria and evaluators. Other essential questions are how much importance is given to policy relevance when selecting projects that receive funding as well as how the programme interacts with policy-makers during its implementation phase and the dissemination of results. It is also important to take note of how direct and indirect policy impacts are taken into account in the mid-term and ex-post evaluations of the research programme (Furman et al. 2006, Kivimaa et al. 2008).

Based on the results from SKEP ERA-Net it can be concluded that participation of relevant stakeholders when defining the objectives and research questions of a programme is important from the point of view of utilising the results (Furman et al. 2006). Civil servants and policy-makers are an important interest group, but other stakeholders can also provide useful expertise and viewpoints that may promote the generation of knowledge that is relevant for policy-making. The participation may occur for example through workshops, seminars or consulting. Representatives of stakeholder groups can also be included into the steering group of a research programme. Several studies indicate that opening the research programme in an interactive way for stakeholders leads to socially robust knowledge that is attractive for decision-making (Sørensen 2002).

Evaluation is an essential part of research programme management. It is a tool for continuous improvement and learning. In order to utilise the results of an evaluation in future programmes, the programme funders and managers should also be open to critical feedback. In programmes that have managed to create a good culture for evaluation, evaluation is perceived as an opportunity to learn from previous mistakes and share good practices rather than a critique. A successful evaluation requires that sufficient resources for evaluation are budgeted already at the planning phase of a programme (Kivimaa et al. 2008). The evaluation criteria should be consistent with the objectives of the programme. For example, if the programme aims at generating policy-relevant knowledge, this should be reflected in the ex-ante and ex-post evaluation criteria of the projects (Furman et al. 2006).

A strong emphasis on scientific publications when evaluating a research programme may encourage publishing in scientific journals at the cost of communication with the public and other stakeholders than the scientific community. Acknowledging this when planning the evaluation helps to include criteria that enable a balanced evaluation and promote the use of research results in policy-making.

The material collected in the SKEP project shows that even though scientific quality is regarded as a primary criterion when evaluating project proposals and completed projects, other balancing criteria, such as policy relevance, are also seen necessary (Kivimaa et al. 2008). Scientific quality does not have to be contradictory to policy relevance. On the contrary, both criteria may be fulfilled simultaneously.

However, the concept of policy relevance is ambiguous and cannot be required without first defining what it means in the context of each research programme. According to Sørensen (2002), policy relevance consists of several factors, such as the availability of research results, their applicability to a given policy problem, their acceptability and how reliable they are perceived.

The use of research knowledge in policy-making depends on several factors. Policy relevance as an evaluation criterion does not as such guarantee that the research results will be used, because the processes of knowledge transfer from science to policy are complex. As mentioned earlier, research programmes should be managed holistically, taking into account all relevant stakeholder groups and potential users of knowledge. In addition, the continuity of research is important in order to generate knowledge that can be used for decision-making. Only long-term research enables the maintenance of capabilities that are needed for reacting rapidly also in situations that cannot be anticipated (Georghiou 2006).

### **Immediate and long-term outcomes of research**

Scientific research and thus its funding have outcomes that can be direct or indirect and that can take place immediately or in a long term. Many ex-post evaluations of research programmes concentrate on the immediate scientific outcomes. These outcomes are typically evaluated by examining the amount of publications produced and references to publications (e.g. Kanninen & Lemola 2006). However, research programmes have also long-term outcomes. These outcomes may relate to, for example, policy-making, collaboration with other research institutes or the industry. Some of the outcomes may be seen in the form of innovations, patents or more environmentally friendly practices. These outcomes may, however, be realised a long time after the programme has ended. Because of the time lag it may be difficult to evaluate the long-term outcomes and attribute them to a certain programme (e.g. Oksanen et al. 2003).

From the point of view of the societal effectiveness of a research programme, it is also important to evaluate its long-term impacts. Scott et al. (2005) have suggested developing a "policy citation index" that would track the policy impact of research in the same way

as other indexes measure citing publications. However, due to the complexity of political decision-making processes this may prove to be challenging.

The evaluation of environment-related research programmes entails some special challenges due to the environmental context. Environmental problems are complex and often require taking measures in several sectors of the society. A research programme may generate knowledge and innovations that have a positive environmental impact on a certain field of activity. However, the programme's impacts are realised only after the innovation has been successfully adopted (Kivimaa & Mickwitz 2006). There are several factors external to the programme that have an influence on whether the innovation will be taken into use or not. Reasons for not adopting an innovation can be for example economic and social factors that cannot be influenced by the programme. One possible approach to address this problem in evaluations is to evaluate the impact potential of a programme and its actual impacts separately (Hjelt et al. 2003). This makes it possible to concentrate on evaluating factors that can be directly influenced by the programme.

Some outcomes of a research programme are of a "conceptual" character. For example, these may be understanding a certain problem better, seeing it differently or acknowledging that less is known about the issue than was previously thought. Conceptual outcomes may have an important role in the basis for new policies, if new knowledge changes the previous conceptions of the policy-makers. Conceptual outcomes serve as a basis for other outcomes. However, their evaluation is more problematic than evaluating outcomes of a more concrete character (Kivimaa et al. 2008).

From the point of view of evaluation it is important to acknowledge that research may turn out to be policy-relevant later on, even if it did not demonstrate direct policy outcomes at the time of an evaluation. A characteristic of research is that its results and outcomes are not totally predictable. Risk taking belongs to research and even failures may result in useful learning processes. If evaluations put too much emphasis on the average performance of research projects, more innovative approaches may be discriminated. Perrin (2002) suggests that instead of evaluating to what extent research projects met their original objectives, evaluations should rather focus on whether the research used new approaches and triggered useful learning processes. For example, many innovations are born as a result of failures and risk-taking.

### **Supra-national research programmes – opportunities and challenges**

Research activities are becoming increasingly international. However, public research programmes are still largely funded and coordinated by national bodies (Carlsson 2006). The EU initiative to promote European Research Area (ERA) and the ERA-Nets as an instrument of networking research funders are one part of the internationalising process.

Supra-national, jointly funded research programmes offer synergetic benefits by gathering together experts of a certain field from different countries. They improve efficiency of research by filling gaps and reducing overlaps. Resources can thus be directed to the research fields that are seen as most important. Research collaboration between countries

also helps to harmonise procedures in the management and evaluation of research programmes.

However, there are extra challenges related to the management of jointly funded research programmes due to the diversity of funding rules and administrative practices. Common guidelines should be flexible enough to enable the cultural aspects of different countries to be taken into account. These cultural features may also pose extra challenges to the focusing of research funding - a research topic that is policy relevant to one funder country might not be relevant to another. Local natural features and societal factors like the main sources of livelihood have an influence on which environmental issues are perceived as most important in each country and what kind of environmental research projects are funded. When evaluating a supra-national research programme, an important question is was there an added value of funding the programme on a supra-national level compared to funding it on a national level (Kivimaa et al. 2008).

When it comes to environmental issues, supra-national research programmes can be seen as especially justified because environmental problems defy national borders. Collaboration between countries and decisions made on a supra-national level are often needed to solve environmental problems. Jointly defined research questions and an increasing interaction with jointly funded research programmes may promote linking environmental research into policy-making. Funding environmental research beyond national borders may also increase commitment to international environmental policy. On the other hand, science-policy interaction on an international level includes more challenges, because there are more interests and cultural differences than on a national level.

Experiences of jointly funded, supra-national research programmes are still rather rare. This is one reason why they are often associated with risks. It is important to have an open discussion about the benefits and challenges related to supra-national research programmes, because that type of programmes are likely to become more common in the future.

## **Conclusions**

Science-policy interface is a topic of growing importance which is reflected, for example, as increasing calls for policy relevance in public research funding. However, the concept policy relevance requires a more specific definition because different research funders and policy-makers may perceive it in very different ways. Interactions between science and policy are often complicated by different time perspectives, interests and ways of communication of the partners. More discussion is needed between different partners to alleviate communication problems caused by the different working cultures and aims within science and policy.

Environmental research and its funding include special challenges that influence the usefulness of research knowledge, its actual impacts and the evaluation of these issues when making the funding decisions. Impacts of research are only realised in practice after new innovations, practices or thinking models are adopted by the users research results. Un-

certainties related to environmental problems as well as gradual or rapid changes in the operational environment make it more difficult to predict the use of research results. Research funding should acknowledge these factors and funding should also be directed to innovative research that does not necessarily seem so policy-relevant at the start.

It is especially challenging to define policy relevance in supra-national, jointly funded research programmes, because there are several funders with different interests, natural environments and sources of livelihood, which has an influence on what kind of research is seen as policy-relevant in each country. Thus, policy relevance and its interpretation should be defined on a programme level already at the initiation phase of a research programme.

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