# Dimensions of Science-Policy Interfaces

## Characterizing Science-Policy Interfaces using complex system thinking

Relativism   Determinism
Co-Evolutionism
Science for Policy
Science in the context of complex issues
...

*Multiple conceptions of science*

System environment (social and natural)

System
Answers ← *Science* → Questions
Resources provided by society/policy

*Knowledge producing system - simple*

System environment (social and natural)

System
Problems → *Policy* → Solutions
Answers provided by science

*Policy producing system- simple*

Instrumentalism   Pluralism
Co-Evolutionism
Policy and power
Policy in the context of complex issues
...

*Multiple conceptions of policy*

blurred boundaries changing over time

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The system of knowledge production is complex because
- it is self-organising;
- it has fuzzy boundaries;
- it is characterised by inherent uncertainty.

The system of policy production is complex because
- it is self-organising;
- it has fuzzy boundaries;
- it is characterised by inherent uncertainty.

*Science - a complex system*

*Policy - a complex system*

Complex systems might be described in terms of the physical/ mathematical metaphor of the *multi-dimensional phase space* - an ideal space in which the coordinated dimensions represent the variables that are required to describe a system.

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*Multi-Dimensional Phase Space of Science*

*Science-Policy Interface - simple*

*Science-Policy Interface - bridging the gap*

*Science-Policy Interface - an intersectional space*

*Multi-Dimensional Phase Space of Policy*

*Multi-Dimensional Phase Space of Science-Policy Interfaces*

### Some of the most relevant and typical dimensions of science:

Purpose:
1) The main purpose of science in general is to find explanations of the world (van den Hove 2005);

issue-driven science, in particular, might serve the purposes of (Renn 1995):
2) providing factual insights to help to identify and frame problems and to understand the situation (enlightenment function);
3) providing instrumental knowledge to allow assessment and evaluation of the likely consequences of each policy option (pragmatic or instrumental function);
4) providing arguments, associations and contextual knowledge to help policy makers reflect on their situation and to improve and sharpen their judgement (interpretative function);
5) providing procedural knowledge to help design and implement procedures for conflict resolution and rational decision making (catalytic function).

Uncertainty:
Scientific knowledge is more or less certain, ranging from certainty -> risk uncertainty -> scenario uncertainty -> recognised ignorance to indeterminacy

Contextuality:
Scientific knowledge can be either time-, space-, and issue specific (highly contextual) or time-, space-, and issue unspecific and general (low contextuality).

Heterogeneity of integrated knowledge:
There are varying degrees of heterogeneity of knowledge integrated into a scientific endeavor. Next to scientific knowledge there exist other forms of knowledge, e.g. practical knowledge and essential knowledge. Further, scientific knowledge can be disciplinary, multi-, inter- or trans-disciplinary.

Saliency:
Produced knowledge is more or less salient, depending on the degree of how relevant users perceive it with respect to themselves and the situation dealt with.

Effectiveness:
The production of scientific knowledge can be more or less efficient with respect to different rationalities. Increasingly, it is economic rationality that influences the which science is produced and which is not.

### Some of the most relevant and typical dimensions of policy:

Contextuality:
Policies might be time-, space-, and issue specific (highly contextual) or time-, space-, and issue unspecific (low contextuality). They might be local and sectoral or global and general.

Decision stakes:
The impact of policies on society is of varying degree. It can be of considerable influence on the situation of actors or it might not have as much impact. It is argued that the more is at stake for social actors and the less certain the knowledge available, the more open should be the policy process to the affected.

Openness:
There exist varying degrees of inclusion and participation of policy processes: from very closed and only political -> inclusion of scientific experts -> inclusion of society (individuals, NGOs, business)

Accountability:
A policy process might lead to more or less accountability. Closely linked to this dimension are issues of democratic core values, transparency, formality, and openness of the policy process.

Formality:
Policy processes might show different degrees of formality. The more formal the more institutionalized is a process. While this helps e.g. in terms of political power and accountability, a higher formality imposes constraints on the flexibility and openness of the process.

Representability:
Depending on the composition of actors admitted to the policy process of policy making these processes can be more or less representable of the social actors the respective policy concerns. Representability is considered to be of importance in respect to quality of the decision, acceptance (and hence effectiveness) of the policy, and democratic core values of the process in general.

Effectiveness:
Policy processes can be more or less effective, especially with regard to the implementation and acceptance of a policy. But also in the political the influence of an economic rationality is increasing.

Dynamism:
An important dimension of interface institutions is their degree of dynamism, i.e. their degree to which they are able to respond to changes over time, in space and of purpose. Also, a high dynamism is precondition for a high adaptivity (learning capacity).

Stability:
Interface institutions might be more or less stable in terms of members, frequency of meetings, procedures etc.

Three sets of structural dimensions:
Derived from Giddens's theory of structuration, which highlights a duality of structure: social structures are constituted by human agency, and yet at the same time are the very medium of this constitution.

Signification and Communication

Domination and Exercise of Power

Legitimation and Evaluation/Judgment

Each dimension consists of a structural and an interactive part by which the systems structures are produced and reproduced. These dimensions constitute the structural core of every social system.

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