Karlsruhe Institute of Technology

Opening the Black Box: Scientific Expertise and Democratic Culture

Institute for Technology Assessment and Systems Analysis (ITAS)

Stefan Böschen

Dynamics to open black boxes

- Benefits of heterogeneity:
  - New forms of knowledge: non-knowledge, local knowledge, future knowledge
  - New forms of governance: participation, consultation
- Democratization of Expertise: “Technologies of humility” against “Technologies of hubris” (Jasanoff 2005a)
- Importance <-> Practicability
  - These ideas are part of our belief-system as Community of TA
  - Questions that need to be raised

Questions to be addressed

- From enjoyment to practicability – difficult questions
  - How to map the different forms of expertise?
  - How to combine different forms of expertise?
  - How to decide which expertise to follow?

- And more difficult questions:
  - “Technologies of hubris” are lasting (look at discourses like “sound science” and “evidence-based science” and their proponents).

  - “Agnotological strategies” (Oreskes/Conway 2010; Proctor 2011): agenda to minimize non-knowledge, but with the goal to repulse regulation efforts.

Questions to be addressed

- Main Question:

How to come to a relatively uncontested expertise by structuring consensus and dissent of different “offers of expertise” and thus create strong incentives for actions and unfold regulatory potential – although “facts are uncertain, values in dispute, stakes high and decisions urgent” (Ravetz 1999:649)?

- The need for meta-expertise:
  - Epistemological question: how to systematize expertise for decision-making?
  - Institutional question: how to design processes to cope with the different forms of expertise while taking decisions?
- Focus: epistemological question of meta-expertise
  - Differentiation between: criteria // indicators // observables
  - Reconstruction of the linkages between them

Outline

- “civic epistemology” – conceptual considerations
- Formation of a civic epistemology: regulation of chemicals
- Observations and analysis
- Epistemological considerations
- Conclusion

“civic epistemology” – conceptual considerations

- Concept of Civic Epistemologies
  - Jasanoff: „Civic epistemology“: „(...) refers to the institutionalized practices by which members of a given society test and deploy knowledge claims used as a basis for making collective choices.“ (Jasanoff 2005b: 255)
  - Miller: „Civic epistemology“: „(...) practices, methods, and institutional processes by which the community identifies new policy issues, generates knowledge relevant to their resolution, and puts that knowledge to use in making decisions.“ (Miller 2005: 406)

- Civic epistemologies – opening black boxes?
  - To structure heterogeneity of different knowledge resources
  - To create institutional environments for processing the different forms of expertise

“civic epistemology” – conceptual considerations

- Context: IPBES (Intergovernmental Platform on Biodiversity and Ecosystem Services) Busan-Meeting, held 2010
- Starting with the Opening Speech by Achim Steiner (07.06.2010) – which knowledge is needed?

“(...) ((to enhance; SB)) developmental and economic life (…) is only possible through sound, solid and uncontested science. Science that revels in the different approaches, encompasses all available knowledge bases including traditional knowledge and brings in the best available data from all corners of the planet in order to reach meaningful and actionable conclusions.“

“civic epistemology” – conceptual considerations

- Social demands:
  - Sound and solid science
  - Uncontested science
  - Meaningful and actionable conclusions

- Epistemic demands:
  - Reveling in different approaches
  - Encompassing all available knowledge bases – also the extra-scientific ones
  - Bringing in the best available data

“civic epistemology” – conceptual considerations

- Context: IPBES (Intergovernmental Platform on Biodiversity and Ecosystem Services) Busan-Meeting, held 2010
- Ending with the Final Document (Busan-Outcome; 11.06.2010) – which knowledge is needed, now?

“The new platform should perform regular and timely assessments of knowledge on biodiversity and ecosystem services and their interlinkages, which should include comprehensive global, regional, and, as necessary, subregional assessments and thematic issues at appropriate scales and **new topics identified by science** and as decided upon by the plenary. **These assessments must be scientifically credible, independent and peer-reviewed**, and must identify uncertainties. There should be a clear transparent process of sharing and incorporating relevant data.“
(Emphasis by SB)

“civic epistemology” – conceptual considerations

- Solutions found: Science as governor of the assessment process
  - Frame of assessment (topics identified by science)
  - Scientific credibility
  - Independence
  - Peer-review process

→ What is the systematic place for local knowledge in this process?

(What about shamans of the rain forest? – peer review procedures for them?)

“civic epistemology” – conceptual considerations

- Heuristic for building up meta-expertise:
  - Criteria: Evaluate indicators against the background of main cultural values or interests
  - Indicators: Representing an effect-related aspect of a problem, which should be considered or solved
  - Observables: Applying indicators by providing specified methods for empirical observations or test strategy

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Civic Epistemology: regulation of chemicals

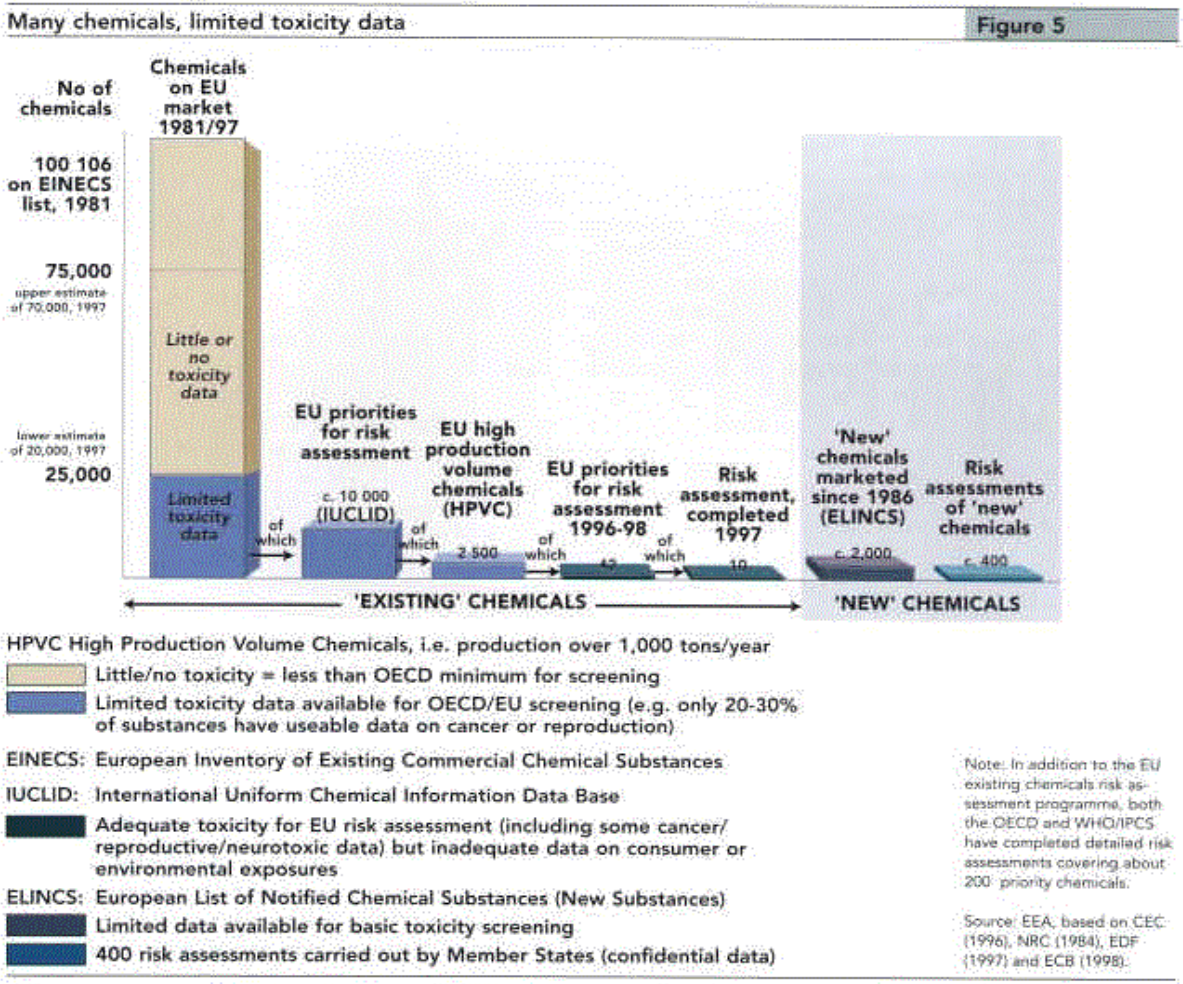
- REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) – 2007
- Stimuli:
  - Low Doses, High Stakes?
  - Generalization of the Precautionary Principle
  - Limitation of the full-test strategy

→ Need for an accelerated production of risk-knowledge (less knowledge – better decisions)

→ Need for knowledge for precaution – new indicators

Civic Epistemology: regulation of chemicals

- From Damage to Precaution: Limitation of full-test strategy



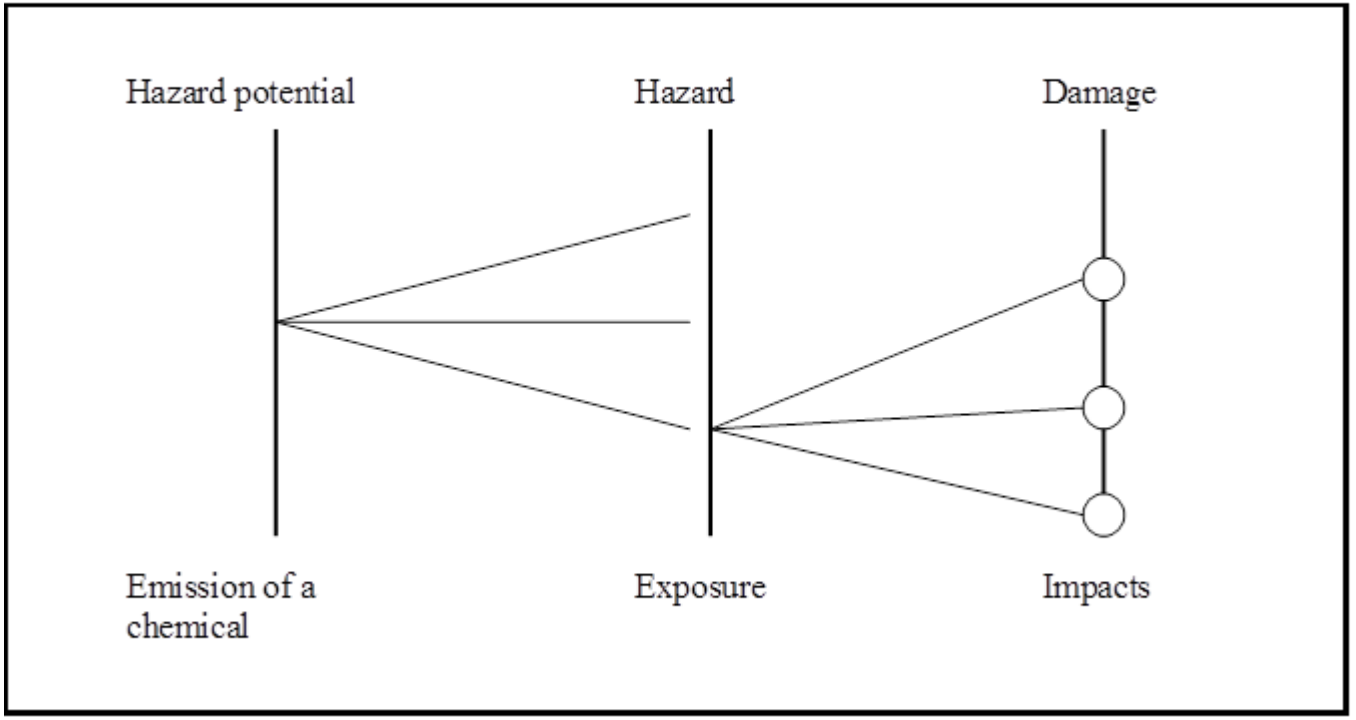
Civic Epistemology: regulation of chemicals

- White Paper 2001:
  - time limits for the discharge of hazardous substances
  - producer responsibility
  - guidelines for the application of PP
  - PBT- in analogy to CMR-substances
  - costs of risk assessment to be covered by industry

- Innovation: PBT = CMR !
  - PBT = Persistency, Bioaccumulation Potential, Toxicity
  - CMR = Carcinogenicity, Mutagenicity, Reproductive Toxicity

Civic Epistemology: regulation of chemicals

- From damage to precaution



Civic Epistemology: regulation of chemicals

- Institutional procedures – innovations:
  - Division of work between industry and administration
    - Responsibility to fulfill the data requirements now lies with the industry
    - Data controlling by ECHA (European Chemical Agency)
  - Chain of risk-knowledge production:
    - Manufacturing chain from producers to downstream-users to generate risk-knowledge
    - Standardization of the system of chemicals regulation: Low thresholds of risk-knowledge
- The system seems to be perfect – are there any limitations?

Outline

- **“civic epistemologies” – conceptual framework**
- **Formation of a civic epistemology: regulation of chemicals**
- **Observations and analysis**
- **Epistemological considerations**
- **Conclusion**

Observations – coherency of the setting?

- Differentiation of three dimensions:
  - Criteria: Evaluate indicators against the background of main cultural values or interests
  - Indicators: Representing an effect-related aspect of a problem, which should be considered or solved
  - Observables: Applying indicators by providing specified methods for empirical observations or test strategy
- The Story
  - Emergence of new criteria: precautionary principle, unified system solution
  - Specific indicators were highlighted with respect to these criteria: Persistence, bioaccumulation potential, (spatial range)
  - Question: What about the observables in the REACH-process? Is it really true: “No data – no market”?

Observations – coherency of the setting?

- What about the observables in the REACH-process? Four levels should be differentiated to detect systematic problems:
- The fixed setting of observables in the legislation itself
- The availability of PBT-oriented data
- The data placed the disposal of administration by the industry
- Administration's ways and capacities to handle the data

Observations – coherency of the setting?

- Four levels to be analyzed: a) The fixed setting of observables in the law itself

2003, the PBT assessment is included; in chapter 4.4, it is described how P, B and T should be evaluated as part of the risk assessment for marine ecosystems. This procedure is proposed in the TGD because PEC and/or PNEC cannot be determined with sufficient reliability for marine ecosystems. Since it is intended to protect marine ecosystems from chemicals with unwanted hazard properties, a PBT assessment is considered appropriate in this case.

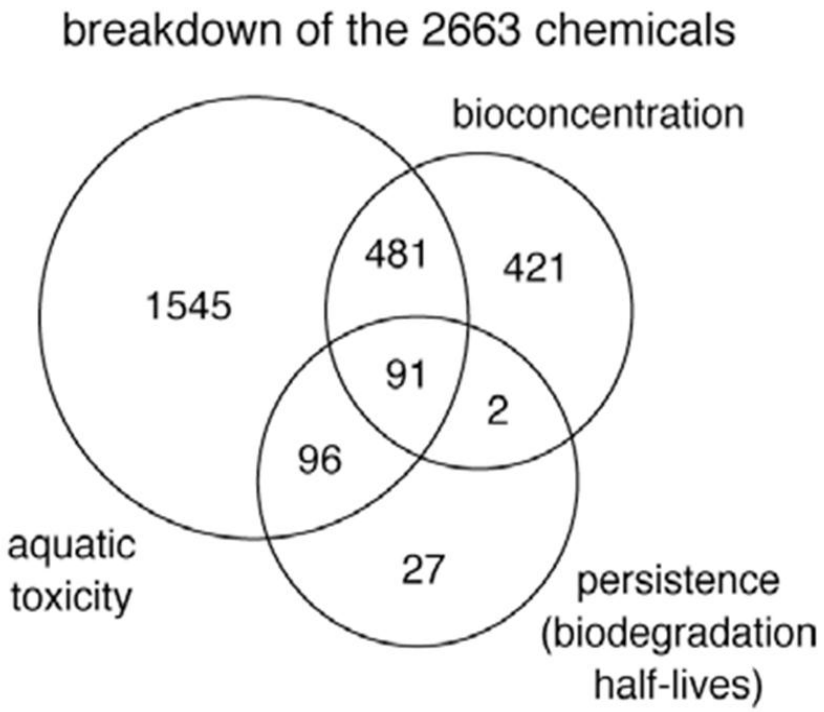
Even before the second edition of the TGD was published in 2003, the White Paper on the Strategy for a Future Chemicals

ported in amounts exceeding 10 t/a, a PBT assessment is required as part of the chemical safety assessment (chemicals between 1 and 10 t/a have to be screened for PBT properties by means of QSAR estimates, as defined in Annex III of REACH). However, for chemicals produced in less than 100 t/a (about 20,000 chemicals), the available data are not sufficient to actually performing the PBT assessment (this inconsistency is addressed in Section 4.3. below). For chemicals meeting the PBT criteria, the registrant is required to perform an emission characterization as part of the chemical safety

Source: Scheringer et al. 2006, p.703

Observations – coherency of the setting?

- Four levels to be analyzed: b) The availability of PBT-oriented data



Source: Strempel et al. 2012 Env. Sci. Technol.

Observations – coherency of the setting?

- Four levels to be analyzed:

c) data placed at the disposal of administration by the industry

- Institutionalized division of work: ECHA has to rely on industry – problems of control (Progress Report of ECHA in 2011)
- Poor data quality in the safety reports
- “Creative” filling of data gaps
- Strategies for waiving additional safety tests

d) ECHA’s ways to cope with heterogeneous data:

- From standard test to a single-case approach
- But: Which kind of expertise?

Observations – coherency of the setting?

- First conclusion: observables were not configured in an appropriate way (inadequate data requirements, failure in test strategies, problems in handling of observables)
- Second conclusion: What can be concluded from the case of REACH?
  - Although there had been an agreement about the set of indicators, the strategy failed by an unclear order of observables.
  - This is connected with the fact that the main criteria continued to be conflicting (industrial base <-> precautionary principle),
  - As the political discourse favored indicators of precaution, the conflict was shifted down to the level of observables and remained unsolved.

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Epistemological Considerations

- Real-world problems are complex:
  - Lots of indicators to describe them.
  - Normally, these indicators are part of a political conflict (“politics of indicators”).
  - Even if there is a consensus about the indicators, the set of observables might be unclear or contested.

Epistemological Considerations

- The importance of meta-expertise – and how to think about it:
  - Mapping the different indicators, which are offered to describe a problem and their related criteria representing specific interests.
  - Evaluating the coherence between indicators and connected observables.
  - Understanding indicators as representatives of different knowledge cultures (epistemic cultures as special case) and their values.
  - Sorting the different indicators in relation to problems of decision-making

Epistemological Considerations

- Meta-expertise – some general remarks

  - With growing complexity of the set of indicators it is more likely that there is no agreement on the **relevant** set of indicators. Strategies:
  - Strategy 1: Transformation to the level of Observables and uprating the density of observation (example “general surveillance”)

    → try to learn something about the problem itself (enhancing transdisciplinary co-observation)
  - Strategy 2: Transformation to the level of criteria and creating a specific institutional framework to process non-knowledge, ambiguity and ambivalence

    → try to learn something about problem-solving structures (enhancing “civic epistemology”)

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Conclusion and Connection to Technology Assessment

- Meta-expertise can be build up by using the mentioned qualifiers for knowledge: criteria // indicators // observables
  - This set is useful to describe the different knowledge perspectives
  - This set is useful to reconstruct the “politics of indicators” pursued by the different actors

- Meta-expertise can uncover the “selective positivisms” of each (collective) actor involved while highlighting the relevant aspects under debate.

- This mentioned meta-expertise connects values to empirical insights and allows a political debate about which dangers are to be averted and which innovations are to be aspired.

Conclusion and Connection to Technology Assessment

- In this sense, such a form of expertise is an important building block in the further development of democratic culture by allowing a *political* debate about knowledge for decision-making.
- … and Technology Assessment:
  - Can help to build up the mentioned form of meta-expertise.
  - Can make transparent the linkages both between indicators and their criteria and indicators and the connected observables.
  - Can make suggestions whether to follow strategy one (enhancing transdisciplinary co-observation) or strategy two (enhancing civic epistemology) or both together.
  - Can proceed as “Honest Broker” (Pielke 2007)

Thank you for your attention !