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Stakeholder involvement in sustainability science—A critical view

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ABSTRACT

Discussions about the opening of science to society have led to the emergence of new fields such as sustainability science and transformative science. At the same time, the megatrend of stakeholder participation reached the academic world and thus scientific research processes. This challenges the way science is conducted and the tools, methods and theories perceived appropriate. Although researchers involve stakeholders, the scientific community still lacks comprehensive theoretical analysis of the practical processes behind their integration – for example what kind of perceptions scientists have about their roles, their objectives, the knowledge to gather, their understanding of science or the science-policy interface. Our paper addresses this research gap by developing four ideal types of stakeholder involvement in science – the technocratic, the functionalist, the neoliberal-rational and the democratic type. In applying the typology, which is based on literature review, interviews and practical experiences, we identify and discuss three major criticisms raised towards stakeholder involvement in science: the legitimacy of stakeholder claims, the question whether bargaining or deliberation are part of the stakeholder involvement process and the question of the autonomy of science. Thus, the typology helps scientists to better understand the major critical questions that stakeholder involvement raises and enables them to position themselves when conducting their research.

1. Introduction: stakeholder involvement in sustainability science

The involvement of stakeholders into science is an expanding trend in an increasing number of research areas, especially in those that besides their technological dimension touch societal, economic and political interests.[1] Due to the complexity of such fields like i.e. the energy transition,[2] the scientific community felt the need to go beyond conventional scientific methods by incorporating non-academic actors' views and knowledge in their research through stakeholder involvement.[3] The concept that is common in the economic realm (mainly to deal with Corporate Social Responsibility strategies) or the political realm (i.e. in decision-making processes) has thus been integrated into the broader science environment and especially into new scientific fields such as sustainability science [60,19,66,54,87,56,120], transformative research[4] [101,113,24,22] and transition research [62,36,37,70,75]. These new fields incorporate a broad array of concepts like post-normal-science [35], mode-2 science [40], mode-3 science [101] or citizen science [53,31] as well as transdisci-

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[1] Schneidewind ([99]: 83) defines the integration of the technological, cultural, economic and institutional dimension in transformative research as "transformative literacy".

[2] We define the energy transition as the process of decarbonizing the energy system through a shift from fossil to renewable energy sources.

[3] There is a variety of terms used, ranging from stakeholder dialogues over stakeholder participation and stakeholder engagement to stakeholder involvement, depending on the scientific field and the research context.

[4] The German Advisory Council on Global Change (WBGU) defines transformation research as the analysis of the transformation process. In contrast, transformative research supports the transformation process ([114]: 23).

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plinary [51,8,23,103,10,55,83] and participatory research strategies [57,59,5,97,102,42,96].[5]

In this context, the main objective of stakeholder involvement is to tackle the "complexity, uncertainty, and multiplicity of values" and perceptions on controversial issues such as the energy transition, or mitigation and adaptation to climate change by combining "expert assessments with problem framings of the lay public" ([58]: 181). Lang et al. [67] refer to objectives of stakeholder involvement by saying that sustainability issues need "the constructive input from various communities of knowledge" – here described as scientists from different disciplines and non-academic-actors – to include "essential knowledge from all relevant disciplines and actor groups related to the problem" as well as allowing for the incorporation of "goals, norms, and visions". Particularly the involvement of citizens is linked to discussions on challenging existing epistemologies of science and assessment of knowledge production and knowledge validity ([107]: 116). Welp et al. ([116]: 170) describe stakeholder involvement in science as the "structured communication processes linking scientists with societal actors such as representatives of companies, NGOs, governments and the wider public", called "science-based stakeholder dialogues".[6] A more pragmatic branch of stakeholder participation engages with the development and implementation of methods and participatory tools intended to support sustainability learning and the transformation of agents through "effective interfaces between knowledge and action" ([50]: 379; [21]: 64)."

This implies that transformative research does not focus on "intrinsic" scientific discussions, but on solving "extrinsic" societal problems ([106]: 180). Weingart and Maasen ([73]: 2) speak of a "democratisation of expertise", whereas Gibbons ([39]: 161), Nowotny [84] and Nowotny et al. [85] call for the creation of "socially robust knowledge" through combining research capabilities with other institutions, actors and practices which are relevant for the transition to take place. Schneidewind et al. ([100]: 134) add that to generate system, target and transformation knowledge in transformative science, the latter has to integrate "context- and experience knowledge of relevant actors". Hayn et al. [49] organize stakeholder input on three different levels: on the analytical level, stakeholders bring in system knowledge through their practical experience; on a normative level they add orientation knowledge through their opinions; and on the operative level they incorporate target knowledge and transformation knowledge by working on solutions with their own set of resources and motivations. Glicken [41] divides knowledge into three types: "cognitive, experiential, and value-based", where cognitive knowledge stems from technical experts, experiential knowledge comes from people sharing their personal experience and value-based knowledge is related to social interests and social values.

Academic literature describes a wide array of opportunities associated with stakeholder involvement – although mostly related to participatory and decision-making processes that concern for example the implementation of GHG mitigation measures [63,68], global processes of change [104] or environmental governance [96,95,3]. Stakeholder involvement is said to increase relevance ([105]: 283; [51]: 125; [4]: 387), legitimacy and credibility ([30]: 228; [17]: 8087; [105]: 283), ownership ([67]; [105]: 283; [3]: 472), effectiveness ([35]: 755) as well as the (social) accountability of research ([116]:171; [40]: 3; [3]: 484ff; [67]; [58]: 182).

However, criticism can also be found in the literature, mostly concerning the validity and credibility of scientific results established through stakeholder involvement ([123]: 4). Concerns relate to co-design – the involvement of stakeholders in the definition of research questions and designs ([101]: 121ff) – and the co-generation or co-production of knowledge – i.e. the integration of societal actors' bodies of knowledge into the actual research process and related scientific findings—([101]: 316; [89]: 269). Pohl et al. ([89]: 271f) identify three major challenges of this co-production of knowledge: the challenge of power, the challenge of integration and the challenge of sustainability. Related to this, some fear that certain kinds of stakeholder involvement might as well threaten the autonomy of science ([106]; [13]: 201; [26]: 14). Brandt et al. ([14]: 7), who define five challenges[7] of transdisciplinary research projects, criticize that currently there is "no clear set of tools required for different process phases or integration of different types of knowledge" as well as little "practitioner empowerment".

Since participatory or decision-making processes – i.e. labelled as "policy dialogues" by Welp et al. [116]: 172f) – typically do not concentrate on the generation of knowledge, we explicitly do not follow these concepts in this article.[8] We instead follow the distinction between *research processes* that aim at improving knowledge and evidence and *decision-making or management processes* as proposed by Mackinson et al. ([74]: 19). While we relate to the approach of Renn and Schweizer ([95]: 176ff), who developed six concepts of stakeholder and public involvement in risk governance based on "philosophies of participation and collective decision making", we in contrast look at the way stakeholder dialogues between science and society are understood by scientists. This perspective, that we find important for carrying out scientific work with stakeholders, is so far underrepresented in the peer-reviewed literature.

In this paper, we establish a typology of scientific perspectives on stakeholder involvement. Section 2 will briefly outline the methodology behind the typology whereas Section 3 will describe the different ideal types we derive. Section 4 shows an example by applying the typology to the field of energy transition research. In Section 5, we use our typology to analyze and systematize the critique with regard to stakeholder involvement by deriving three continua that enable scientists to position themselves. We conclude by pointing out the critical choices for scientists that arise from this analysis in Section 6.

2. Methodology

Depending on the perspective one takes, stakeholder involvement practices and the difficulties and critical choices they entail, differ substantially. In order to show this, we establish a typology of ideal types of scientific perspectives on stakeholder involvement. Though in practice there might only be hybrid forms, the development of ideal types has a long tradition in sociological studies. They serve as a research heuristic that stresses and exaggerates distinctive characteristics of a group of cases to disentangle different categories ([61]: 83).

In order to develop our types of stakeholder involvement in science, we apply five criteria of differentiation:

[5] The movement of action research also belongs to these new research strategies [1].

[6] A science-based stakeholder dialogue needs to be designed in an open manner such that stakeholders are able to communicate their beliefs as well as constraints or boundary conditions that they feel limit their freedom to act ([58]: 181).

[7] Three of the challenges that were evaluated via an analysis of case studies relate to the discussion in this paper: "research process and knowledge production; practitioner involvement; generating impact" ([14]: 2ff).

[8] Welp et al. ([116]: 172) differentiate policy dialogues, multi-stakeholder dialogues for governance, science-based stakeholder dialogues and corporate dialogues based on their objectives.