

Science for the Future: The potential of inter- and transdisciplinary sustainability research

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Introduction

Sustainability research is aimed at meeting the challenge of dealing with important societal problems related to the 'metabolic' processes between society and nature in a global context. Besides generating knowledge about the characteristics and dynamics of the complex processes involved (e.g. climate change, loss of biodiversity, the degradation of soils and forests, increasing poverty and hunger), it should generate normative knowledge about how to evaluate these processes and develop strategies for social change towards sustainability.

The complexity and the character of the problems sustainability research is confronted with can only be dealt with by an interdisciplinary research team. The normative questions and the need for decisions in situations of uncertainty additionally call for a transdisciplinary research design involving actors from life world as equal partners.

Challenges of inter- and transdisciplinary research

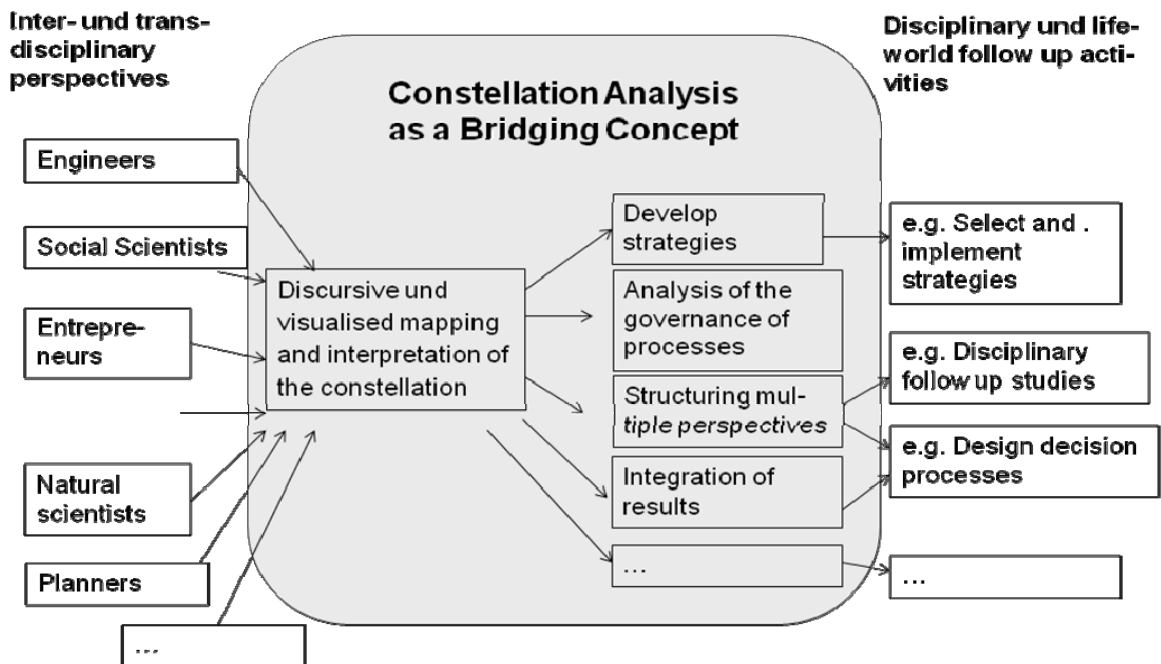
Interdisciplinary research is facing the challenge that the theoretical and methodological approaches from different disciplines have to be integrated and the scientists have to agree on a common definition of the research problem. If life world actors are included in the process, the problem of speaking "different languages" and acting with different rationalities is even greater. While scientists aim at a thorough understanding and have to apply their methods according to scientific standards, decision makers in politics or business often are obliged to take decisions under time pressure.

Achieving a mutual understanding in inter- and transdisciplinary research teams and ensuring a fruitful cooperation therefore is a demanding process which should be supported by an adequate cooperation management.

The Center of Technology and Society at the Technische Universität Berlin has a lot of experience in carrying out inter- and transdisciplinary research (Schäfer 2007a/ 2007b; Schäfer and Boeckmann, 2004). To integrate practitioners in the research process it is applying innovative participation methods like citizen juries and exhibitions. It has published several hand books for inter- and transdisciplinary cooperation management (von Blanckenburg et al., 2005; Schophaus et al., 2004,) and developed a tool for inter- and transdisciplinary discourse, the constellation analysis (Schön et al., 2007).

The constellation analysis: a tool for inter- and transdisciplinary discourse

The constellation analysis has been applied in several projects in the field of innovation or sustainability research (e.g. Kruse, 2008; Ohlhorst, 2009; Schön et al., 2007, Meister et al., 2005). It always starts with a collective and iterative graphical mapping of the relevant elements and relations of the issue under investigation. In the mapping process, differences between social actors, technical elements, natural elements and systems of signs are highlighted, but there is no a priori decision about their relevance for the issue under consideration. Including these elements on equal terms and visualizing the constellation allows the different disciplines as well as the practitioners to contribute with their specific perspective.



Source: translation from Schön et al., 2007

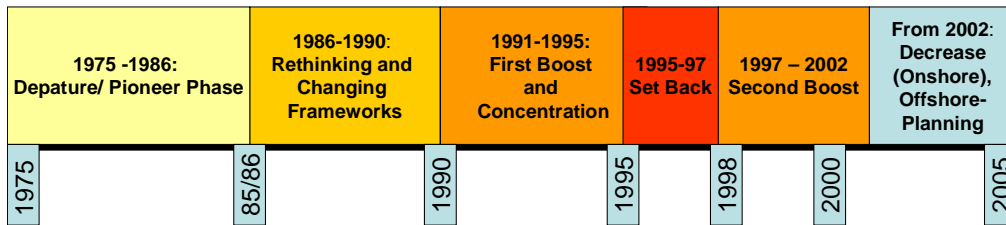
Picture 1: Constellation Analysis as a Bridging Concept

By identifying the dominant actors and relations, the constellation analysis facilitates the discourse about the status quo of a problem and creates transparency about different perspectives. It can be used for mapping different stages of a certain process (e.g. an environmental conflict or an “innovation biography”). It can also be applied for mapping possible future developments anticipating a change in elements or in their relations. Furthermore it can be helpful by integrating the results of different disciplines.

Innovation biography of the German wind energy sector: one example of applying the constellation analysis

The German wind energy sector has seen rapid growth during the last 40 years and was marked by a dynamic process of innovation. Germany has become the world’s leading wind energy producer. The research project “Innovation Biography of Wind Energy” (Ohlhorst, 2009), proceeded from the hypotheses that in the course of the innovation of wind energy, both the network structure of decision makers and the application of technology shifted. It was supposed that the technical and natural elements are closely linked to institutional and social developments and that this heterogenous constellation is permanently reorganized. To be able to understand the dynamics of this innovation process, the constellation of the wind energy sector was mapped in different phases. In an inter- and transdisciplinary research process the relations between the main elements and the impact of regulation measures could be understand. This process allowed the actors of the wind energy sector to learn from the biography of the sector for future development. Furthermore it is possible to transfer knowledge about the innovation history of one sector for understanding commonalities and differences in other sectors (solar energy, energy from biomass). Picture 2 summarizes the development of the German wind energy sector in different phases, pictures 3 and 4 show examples of the constellation in two phases.

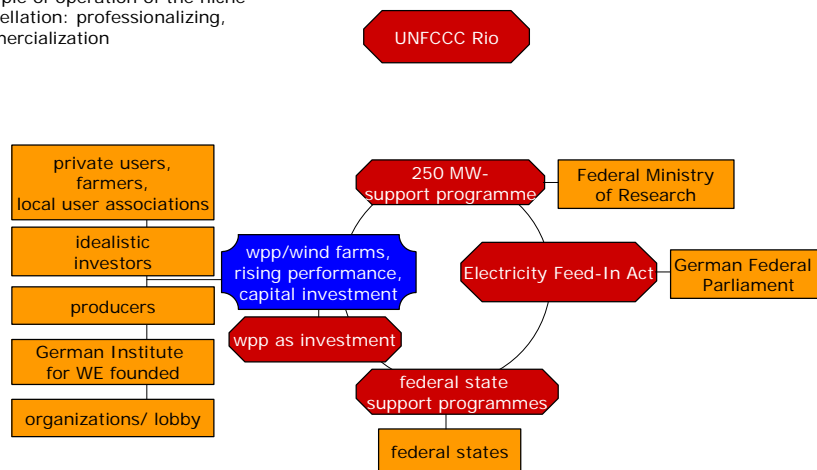
Picture 2: Phases of the development of the German wind sector (source: Ohlhorst 2009)



Picture 3: First Boost and Concentration

1991-1995 First Boost And Concentration

principle of operation of the niche constellation: professionalizing, commercialization

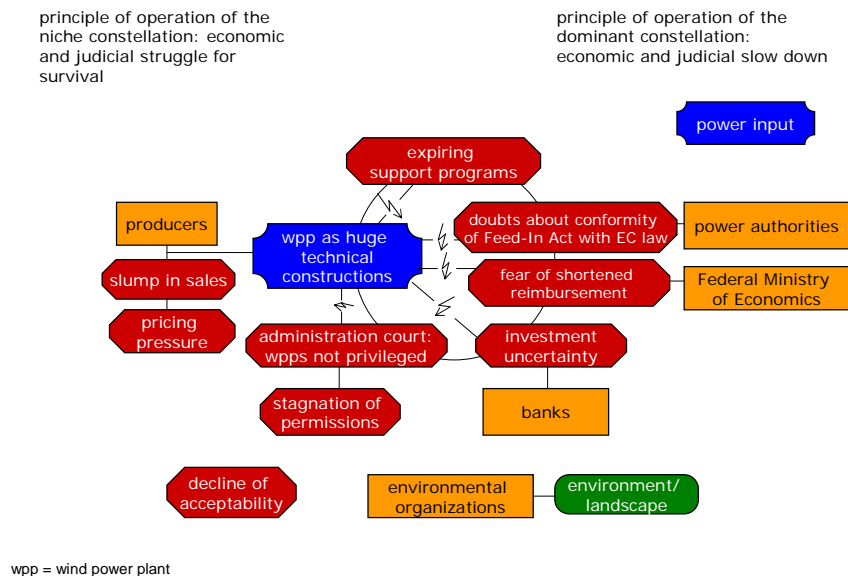


wpp = wind power plant
 WE = wind energy

Source: Ohlhorst, 2009

Picture 4: Set Back

1995 - 1997/98 Set Back



Source: Ohlhorst, 2009

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