

Chapter 2

The Emergence of Transdisciplinarity as a Form of Research

Gertrude Hirsch Hadorn, Susette Biber-Klemm,
Walter Grossenbacher-Mansuy, Holger Hoffmann-Riem, Dominique Joye,
Christian Pohl, Urs Wiesmann and Elisabeth Zemp

Abstract The birth of science is based on a strict dissociation of scientific knowledge from the various aspects of practical knowledge. The ideal of scientific knowledge as it was shaped in antiquity is still influential today, although the conception of science and the relationship between science and the life-world has undergone major changes. The emergence of transdisciplinary orientations in the knowledge society at the end of the 20th century is the most recent step. The Handbook focuses on transdisciplinarity as a form of research that is driven by the need to solve problems of the life-world. Differences between basic, applied and transdisciplinary research, as specific forms of research, stem from whether and how different scientific disciplines, and actors in the life-world, are involved in problem identification and problem structuring, thus determining how research questions relate to problem fields in the life-world. However, by transgressing disciplinary paradigms and surpassing the practical problems of single actors, transdisciplinary research is challenged by the following requirements: to grasp the complexity of the problems, to take into account the diversity of scientific and societal views of the problems, to link abstract and case specific knowledge, and to constitute knowledge with a focus on problem-solving for what is perceived to be the common good. Transdisciplinary research relates to three types of knowledge: systems knowledge, target knowledge and transformation knowledge, and reflects their mutual dependencies in the research process. One way to meet the transdisciplinary requirements in dealing with research problems is to design the phases of the research process in a recurrent order. Research that addresses problems in the life-world comprises the phase of problem identification and problem structuring, the phase of problem investigation and the phase of bringing results to fruition. In transdisciplinary research, the order of the phases and the amount of resources dedicated to each phase depend on the kind of problem under investigation and on the state of knowledge.

✉ G. Hirsch Hadorn

Department of Environmental Sciences, ETH Zurich, Zurich, Switzerland
e-mail: hirsch@env.ethz.ch

Keywords: Knowledge society · Problem fields in the life-world · Conception of science · Research process · Knowledge forms

2.1 Science and Life-world: From Dissociation to Transdisciplinary Orientations in the Knowledge Society

At the cradle of science in Greek antiquity the idea evolved that science is basically a cognitive faculty for explaining the development of natural things, including humans. Scientific explanations must be based on principles inherent to natural things, which Aristotle (384–322 BCE) saw as their universal unchangeable form. Aristotle claimed that humans are capable of capturing these evident first principles in ‘contemplation’, which is the meaning of the Greek term ‘*theoria*’. In antiquity, ‘theory’ meant the knowledge about self-evident principles on which scientific demonstration is based. This kind of scientific knowledge (*epistême*) is of no use for day to day living. To lead their life, humans need skills to act (*praxis*) and to produce (*poiêsis*), and they need prudence (*phronêsis*) to deliberate about things that allow choice. So, the birth of science is based on a strict dissociation of scientific knowledge from the various aspects of practical knowledge (Aristotle, 2003).

The distinction between scientific and practical knowledge gives rise to the ideal that scientific knowledge is universal, explanatory, demonstrated to be true by a standard method, teachable and learnable. As a consequence, science has to be detached from practical life or the life-world. The term ‘life-world’ is used for what the phenomenologist Edmund Husserl (1859–1938) called ‘*Lebenswelt*’ – meaning the ongoing lived experiences, activities and contacts that make up the world of an individual or corporate life. Alfred Schütz (1899–1959) introduced the term into sociology to describe the structural properties of social reality as grasped by the agent – the agent’s life-world (Schütz and Luckmann, 1973). Jürgen Mittelstraß uses the term in defining ‘transdisciplinarity’ as a form of research that transcends disciplinary boundaries to address and solve problems related to the life-world (Mittelstraß, 1992).

The ideal of scientific knowledge as it was shaped in antiquity is still influential today, although the conception of science and the relationship between science and the life-world has undergone major changes. Important transformations have taken place. The enlightenment started with the dissociation of the natural sciences from philosophy, followed in the 19th century by the establishment of the humanities and the social sciences as separate specialised disciplines in universities. The emergence of transdisciplinary orientations in the knowledge society at the end of the 20th century is the most recent step in reshaping the conception of science and the distinctions between science and the life-world.

The conception of science in the modern period is shaped by the dissociation of the natural sciences from philosophy. The foundations of theory oriented experimental interventions into nature were in place by the end of the 16th century. Modern natural science retains the idea that scientific knowledge is about general