

## Chapter 2

# Current Drivers of Interdisciplinarity: The What and the Why

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### ABSTRACT

*Calls for interdisciplinarity abound across science and technology, social sciences, humanities, and arts. They also populate reports from professional societies, educational organizations, and funding agencies. Definitions of “what” interdisciplinarity is are entangled with justifications of “why” particular practices are important in a semantic web of purposes, contexts, organizational structures, and theoretical constructs. Citations to earlier literature appear throughout the chapter, but it is the first publication to present insights from the latest authoritative accounts in the 2017 edition of The Oxford Handbook of Interdisciplinarity. The chapter begins by describing four major drivers identified in a 2005 report on Facilitating Interdisciplinary Research and the current ascendancy of transdisciplinarity. It then examines controversies and problematics in three major faultlines of debate: the relationship of disciplinarity and interdisciplinarity, the status of interdisciplinary fields, and tensions between instrumentality and critique. The conclusion reflects on future directions and recommendations, noting patterns of increase alongside continuing challenges.*

### INTRODUCTION AND BACKGROUND

Calls for interdisciplinarity abound. They appear across science and technology, social sciences, humanities, and arts. They also populate reports from professional societies, educational organizations, and funding agencies. In a recent account of funding agencies in particular König and Gorman (2017) reported websites of the US-based National Institutes of Health and National Science Foundation, the German Research Agency, the French National Center for Scientific Research, the British Research Councils, the European Research Council, the Japan Science and Technology Agency, and the recently formed Global Research Council all mention interdisciplinary research explicitly. The question of “what” constitutes

DOI: 10.4018/978-1-5225-3878-3.ch002

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interdisciplinarity cuts across all accounts. Introducing the second edition of *The Oxford Handbook of Interdisciplinarity*, Robert Frodeman (2017) calls the terms “interdisciplinarity” and “transdisciplinarity” boundary objects that have had different meanings at different times and for different groups. In the same volume Huutoniemi and Rafols (2017) also contend multiple claims tend to paralyze debate on definition. Yet, clear patterns appear.

The most widely cited definition of current drivers appears in a 2005 benchmark report on *Facilitating Interdisciplinary Research* (National Research Council, 2005). After describing the four major drivers identified in the report, this chapter examines three major faultlines of debate: the relationship of disciplinarity and interdisciplinarity, the status of interdisciplinary fields, and tensions between instrumentality and critique. The conclusion then reflects on differing assessments of interdisciplinarity at this historical point. The overarching framework of the chapter is the concept of boundary work, a composite label for claims, activities, and structures by which individuals and groups work directly and through institutions to create, maintain, break down, and reformulate lines between knowledge units (Fisher, 1993, pp. 13–17; Klein, 1996, pp. 57–84). Definitions of “what” interdisciplinarity is are entangled with justifications of “why” particular practices are important in a semantic web of purposes, contexts, organizational structures, and theoretical constructs. Citations to earlier literature appear throughout the chapter, but it is the first publication to highlight insights from the latest edition of *The Oxford Handbook*. No single book can be definitive. However, the most recent accounts provide an authoritative overview of current drivers.

The task force that wrote the US-based National Research Council’s 2005 report on *Facilitating Interdisciplinary Research* identified four major drivers based on literature review, national surveys, and expert consultations (National Research Council, 2005, p. 2):

1. The inherent complexity of nature and society.
2. The desire to explore problems and questions not confined to a single discipline.
3. The need to solve societal problems.
4. The power of new technologies.

None of these catalysts is new. However, Driver #1–“complexity”–has become a prominent theme in the discourse of interdisciplinarity in recent decades. Older theories favored the idea of unity of knowledge. It is countered, however, by the view that unity is impossible given the current complexity of nature and society, in systems ranging from social organization and health care to the geosphere and the biosphere. Driver #2 is strongly associated with boundary crossing at the interfaces between disciplines, focusing on questions that lead to interdisciplinary investigations that range from the nature of the solar system to human cognition. Scientists in particular often link Driver #3 with discovery, including breakthroughs such as x-ray crystallography and the structure of DNA. Driver #3 prioritizes problem solving in a litany of challenges ranging from climate change and food security to peace and social justice. The line between fundamental understanding and pragmatics of problem solving, though, often blurs. Steve Fuller (2017) cites, for instance, Louis Pasteur’s efforts to prevent bacteria from destroying the silk, milk, wine, and beer industries and from killing troops suffering battlefield infections. While “applied” in nature, this research is now claimed to be a “scientific discovery” in biology and medicine.

Like complexity, Driver #3 has also escalated, prioritizing economic, technological, and scientific problems over epistemological questions of knowledge. Indicative of that trend, Frodeman (2017) reports the utility of interdisciplinarity and the word “innovation” stood out across the 46 essays of the updated *Oxford Handbook*. Driver #3 is not new either. It was the catalyst for problem-oriented research at the

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