An Introduction to Knowledge Commons

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Title: *Knowledge Commons*
Synonyms: commons in the cultural environment, information commons, cultural commons, science commons, data commons, knowledge pools
Definition: Knowledge commons refers to the institutionalized community governance of the sharing and, in some cases, creation of information, science, knowledge, data, and other types of intellectual and cultural resources.

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Main text:

Knowledge commons refers to an approach (commons) to governing the management and/or production of a particular type of resource (knowledge). *Commons* refers to a form of community management or governance. It applies to resources, and involves a group or community of people, but commons does not denote the resources, the community, a place, or a thing. Commons is the institutional arrangement of these elements. "The basic characteristic that distinguishes commons from noncommons is institutionalized sharing of resources among members of a community" (Madison, Frischmann & Strandburg 2010: 841). Critically, commons governance is used by a wide variety of communities to manage many different types of resources. Commons governance confronts various obstacles to sustainable sharing and cooperation. Some of those obstacles derive from the nature of the resources and others derive from other factors, such as the nature of the community or external influences. Communities can and often do overcome obstacles through constructed as well as emergent commons. For purposes of this entry, *knowledge* refers to a broad set of intellectual and cultural resources. There are important differences between various resources captured by the broad definition (e.g., knowledge, information, and data are different from each other in meaningful ways), but an inclusive term is necessary and prior attempts to use "cultural environment" were cumbersome (for further explanation, see Frischmann, Madison & Strandburg 2014; Frischmann 2013; see also Bertacchini et al 2012). Accordingly, the resource set includes information, science, knowledge, creative works, data, and other related resources. *Knowledge commons* thus refers to the institutionalized community governance of the sharing and, in some cases, creation, of a wide range of intellectual and cultural resources.

Some examples illustrate the variety of institutional arrangements and resources that are knowledge commons. Most obvious may be research commons, given the importance of sharing and collaboration norms within scientific research communities (Reichman and Uhlir,

2003; Merton, 1973). Reichman and Uhlir (2003) examined scientific data commons, pressures on the "sharing ethos" within various scientific communities, and institutional means for reconstructing commons. Cook-Deegan and Dedeurwaerdere (2006) examined research commons in the life sciences and mapped out some of the relationships between the structure and function of the resource commons and the relevant community. The National Research Council of the National Academies sponsored an international conference in 2009 that explored microbial research commons. Participants examined how upstream microbial research inputs—microbial data, literature, and research materials—can be managed as a commons (Reichman, Dedeurwaerdere and Uhlir, forthcoming).

Madison, Frischmann and Strandburg (2010) discussed the following less obvious examples: *intellectual property pools*, in which owners of patents in a technological domain license their patents to a common "pool" from which producers of complex products can obtain all of the permissions needed to make and sell goods that use the patents (Shapiro 2000; Merges 1996); *open source computer software projects*, which offer users of open source programs the ability to create and share modifications to the programs (Schweik & English 2012); *Wikipedia*, which offers users of this Internet encyclopedia the power to add to and edit its contents (Hoffman & Mehra 2009); *the wire service for journalism operated by the Associated Press*, which allows individual member media outlets the opportunity to publish work produced by other members; and *"jamband" fan communities*, which record, share, and comment on musical performances of their favorite groups—with the permission of the artists themselves (Schultz 2006). They mentioned additional examples, including medieval guilds, "the modern research university and the departmental and disciplinary structures that lie within and above it," and the Request for Comments ("RFCs") series that defines the technical protocols of the Internet. Frischmann, Madison & Strandburg (2014) presents case studies ranging from rare disease research consortia to recreational roller derby leagues (Frischmann, Madison & Strandburg 2014).

There are many different knowledge commons. Yet we know very little about them: How do such commons work? Where do they come from, what contributes to their durability and effectiveness, and what undermines them?

In the past decade, scholars in various disciplines have become interested in studying these types of commons, and some have begun case studies. However, their research too often is focused narrowly on the specific case or an isolated area, such as academic publishing or open source software, and fails to investigate the broader institutional questions and to appreciate the need for systematic analysis. As a result, they tend to consider only a limited number of descriptive variables, which makes integration and learning from a body of case studies quite difficult.

Building on Ostrom (1990), Ostrom (2005), and Hess and Ostrom (2006), Frischmann, Madison and Strandburg developed a framework for the systematic study and comparative analysis of knowledge commons. (Madison, Frischmann & Strandburg 2010; Frischmann, Madison & Strandburg 2014). The underlying nature and structure of the inquiry as well as the focus on complexity, context, communities, and institutions unites our project with Elinor Ostrom's

legacy. Nonetheless, the Institutional Analysis and Development framework needed to be adapted and extended to account for significant differences between natural resource commons and knowledge commons. Most obviously, the resources are different, and as a result, the obstacles that must be overcome for institutionalized sharing to work are different. Thus, for example, the governance structures for knowledge commons manage existing resources as well as production and integration of new resources. Another interesting complication is the complex role of legal institutions in delineating intellectual resources, for example, by defining what constitutes the expression in software that might be governed by open source software licenses. Notably, this complication raises resource boundary and corresponding resource management issues that are less salient for natural resource commons. Madison, Frischmann and Strandburg (2010) and Frischmann, Madison & Strandburg (2014) explore these and other differences extensively, and explain why the differences call for a series of inquiries specifically tailored to knowledge commons.

Details on the collaborative, interdisciplinary, and international knowledge commons research program can be found at http://knowledge-commons.net/.

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