24 The role of law, institutions and governance in facilitating access to the scientific research commons

A philosopher's perspective

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24.1 Introduction

Innovation in the life sciences depends on how much information is produced as well as how widely and easily it is shared. As shown by the contributions in this volume, policies governing the science commons – or alternative, more restricted information spaces – determine how widely and quickly information and research tools are distributed. The purpose of this chapter is to highlight why the science commons matters, and to analyse its organization. The concern for the governance of the science commons has caught the attention of a wide range of scholars in the mid 1990s, especially in legal scholarship.[1] The interest of these scholars is in the cooperative use of scientific data, information, materials and research tools that actually are not in the public domain, and whose licensed use is legally protected by an intellectual property (IP) regime.[2] In its more general meaning however, the "commons"

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[1] Benkler, Y., 'Overcoming Agoraphobia: Building the Commons of the Digitally Networked Environment', **11**(2) *Harvard Journal of Law and Technolgy*, 287–400; Reese, R. A., 'Reflections on the Intellectual Commons: Two perspectives on Copyright Duration and Reversion', **47**(4) *Stanford Law Review*, 1995, 707–47; Lessig, L., *Code and Commons*, Keynote Address at the Conference on Media Convergence, Fordham University Law School (9 February, 1999). Online at www.lessig.org/content/articles/works/Fordham.pdf (accessed February 2008).

[2] Reichman, J. and Uhlir, P.F., 'A contractually reconstructed research commons for scientific data in a highly protectionist intellectual property environment', **66** *Law and Contemporary Problems*, 315–440, 2003; David, P.A. and Spence, M., 'Towards institutional infrastructures for e-science: the scope of the challenge', Oxford Internet Institute, *Research Report* No. 2, September 2003, 98

designates any resource shared by a group of people that is subject to problems of underprovision or overconsumption of the shared resource, independently of its legal nature.[3] From this general perspective, the scientific research commons, which we will call hereafter shortly the science commons, designates the scientific data, information and materials which are shared under conditions of non-exclusive use (though perhaps limited in its extent or use, depending on the collective agreements) within limited or global research communities.[4]

The main hypothesis of this chapter is that both the formal legal models and the institutional and governance characteristics of the various research and users communities – think of the Bermuda principles in the human genome case[5] or the National Institutes of Health (NIH) guidelines on the licensing of genomic inventions[6] – matter in organizing the translation of research results into usable knowledge, products and procedures.

Our analysis will proceed in two steps. First we will focus on one of the main lessons of this book from the point of view of institutional analysis: the involvement of the scientific and the user communities in innovative contractual agreements has proven to be successful in alleviating some of the collective-action problems that are raised in genomics research. Second, we will show the necessity of going beyond a formal legal analysis of the agreements and models. Indeed, the legal rules interact with the formal and informal institutions which regulate

[3] Hess Ch. and Ostrom E., *Understanding Knowledge as a commons. From Theory to Practice*, Cambridge (MA), MIT Press, 2007, 3–10.

[4] There is some wobble in the term "science commons". The term the "commons" has been used extensively in legal scholarship to designate goods in open access (cf. references in footnote 1). In the same time, "Science Commons" is a specific organization that has spun out of the Creative Commons movement. Science Commons has moved from concept to action in the year 2005, with an office and executive director to carry out its mission of "making it easier for scientists, universities, and industries to use literature, data, and other scientific intellectual property and to share their knowledge with others. Science Commons works within current copyright and patent law to promote legal and technical mechanisms that remove barriers to sharing". While we endorse their mission, they may not endorse our analysis, and we have no direct connection to the organization, and do not speak for it. As explained above, we adopt the more general definition that has been adopted at major international conferences on these issues (the "Conference on the Public Domain", organized at Duke University in November 2001 and the "Workshop on Scholarly Communication as a Commons", organized at Indiana University in Bloomington, spring 2004) the results of which have been published in a collective volume at MIT Press (Hess and Ostrom, *Understanding Knowledge as a commons*).

[5] See www.ornl.gov/sci/techresources/Human_Genome/research/bermuda.shtml for an overview of the Bermuda principles (last visited 15 October 2007).

[6] National Institutes of Health, *Best Practices for the Licensing of Genomic Inventions: Final Notice*, Federal Register, Vol. **70** (68), Monday, April 11, 2005.

individual behaviour in communities and organizations. This interaction can be mutually reinforcing, neutral or antagonistic. Based on the insights of the literature on institutional analysis, we will analyze the role of formal and informal institutions in the organization of research in genomics, and indicate how the interaction between different types of rules can be addressed.

24.2 The contractually reconstructed public domain in diagnostic genetic testing

The problem of access to genes as research tools for diagnostic genetic testing suggests that the theory of the science commons, which focuses on the public good properties of resources that are essential for scientific research, may also have some use in the case of applied research, here in the case of genes as research tools which are used in a broad set of more specific applications. The discussion of the different legal models for reconstructing the commons in this volume shows that a variety of social goals can benefit from a robust scientific commons in genomics: these include advancing science, improving public health, improving food security, contributing to understanding and conserving biological diversity, and contributing to industrial R&D and commercialization.

When Robert Merton wrote about the sociology of science, the central task at hand was explaining how a set of social norms and practices yielded reliable knowledge.[7] Our concern here is about a related but distinct topic – how reliable knowledge can be turned to social benefit and used in practical applications. The point of connection is science that falls squarely into what has been called "Pasteur's Quadrant", where it both contributes to insights about how the world works and promises to make the world a better place through practical application.[8] This field of research in between pure basic research and pure applied research is especially important in the life sciences, because of the complexity of biological systems which are characterized by non-linear processes that are path dependent, can show abrupt change and have unpredictable dynamics. These features call for knowledge which is context specific and which can enhance human adaptability and cope with uncertainty when biological processes unfold in different specific environments, such as genes being expressed differently in different metabolisms or

[7] Merton, R. K., *The Sociology of Science*. Chicago, University of Chicago Press, 1973.
[8] Stokes, D.E., *Pasteur's Quadrant: Basic Science and Technological Innovation*. Washington DC, Brookings Institution Press, 1997.