

RESPONSIBLE KNOWLEDGE-BASED INNOVATION

David H. Guston

“Corruption,” a charge leveled by Professor Craig Calhoun, after Jennifer Washburn’s allegations in *University, Inc.*, is a serious one. It is not at all clear to me that either has the goods on universities for this indictment to hold—especially when Calhoun, perhaps more politic than prosecutorial, argues toward the end of his paper that structural conditions lie at the heart of universities’ unseemly behavior: The commercialized university is a symptom of a deeper, pervasive commodification of public life, rather than an aberration.

Distressing as this symptom may be, as “corruption” it also presents more than a hint of democratization. The social forces that level charges of corruption are often elites defending a system of traditional values against patronage, spoils, profit—but also merit, competition, the crossing of social boundaries, and other practices with a decidedly egalitarian or populist edge. And as clearly as Calhoun acknowledges that the commercial orientation of universities is not new to the Bayh-Dole era, he just as clearly laments the passing of an age when universities and academics were more distant from the rough-and-tumble of Tocquevillean democracy.

However legitimate we consider the forces that have given rise to the commercialized university, we must understand more explicitly than Calhoun has let on that there is a political economy, that is, a dynamic logic of interests to them. Known now in the literature as the “triple helix” for the tight intertwining and mutual affinity of the government, commercial, and academic sectors, this political economy of knowledge-based innovation impels, sustains, and benefits from the changes Calhoun and Washburn lament. Although Washburn offers remedies, even Calhoun agrees that, focused as they are at the margins of conflicts of interest, they are “surprisingly modest.” More than such marginal regulations to the central dynamics of the triple helix, what is needed is the articulation and institutionalization of a competitive logic of interests—a different political economy of knowledge-based innovation that has at its core responsibility and public values rather than self-interest and market values.

Given the unlikelihood of a radical shift in the intellectual property regime, Calhoun, Washburn and other likeminded reformers must find a way to make proprietary knowledge of science, licensing, and the lot work for their cause. One remedy need only be excavated from Calhoun’s critique. Rather than serving as a bad example, the Cohen-Boyer patent on recombinant DNA techniques is a rather good one for two reasons. First, Stanford issued non-exclusive licenses at relatively low cost, enabling the widespread use of an enabling technology. Second, and more important for my purposes, Stanford placed a public-regarding condition on the license: Protocols that governed the safe and ethical use of recombinant DNA, articulated by the Recombinant DNA Advisory Committee of the National Institutes of Health, bound only those researchers working with federal funds; the Stanford license bound to these standards even private entities who applied the licensed techniques.

A similar example of leveraging intellectual property for the public good occurred with another of Calhoun’s examples, the stem cell patents at the University of Wisconsin. The Wisconsin Alumni Research Foundation, which has managed the commercialization of UW intellectual property for more than seven decades—embodying the non-novelty of the commercialized university!—placed limits beyond those required by the government on public and private sector researchers using its stem cells, by forbidding licensees from mixing the stem cells with intact human or non-human embryos, implanting the stem cells or their products in a uterus, and using them to attempt to make a whole embryo.

The Stanford and Wisconsin examples demonstrate that universities can commit to public values even while attending to commercial ones. It is by no means clear that such restrictions would be effective for any but similarly controversial innovations. It is also by no means clear that individual universities can be trusted to divine the public good in crafting such restrictions, rather than, for example, using a license to expand a “commu-

nity standard” (imagine, for example, a university affiliated with a religious order patenting a controversial reproductive technology but restricting licenses on doctrinal grounds). Nevertheless, intellectual property can offer opportunities for universities to create a new political economy of knowledge-based innovation by attaching public values to those innovations and disseminating them with those values intact.

As Calhoun makes clear, universities arrived at their current state with the full encouragement of our governing institutions. The Bayh-Dole Act was enormously popular in Congress, and state legislatures have deliberately reduced their support of public universities. One can argue—indeed, it is crucial to recognize—that these decisions, although rendered by democratic institutions, are not in and of themselves democratic, as the salience of such policies rarely rises to the level that voters would hold decision makers accountable for them alone. But they are, nevertheless, a legitimate expression of some public preferences, and it is important to validate the principle that universities and, through them, the research enterprise, can be governed democratically.

Indeed, in this view, Bayh-Dole (and the Offices of Technology Transfer now part of every major research university) stands, along with the universities’ implementation of human subjects protection through Institutional Review Boards, as a primary example of the responsible pursuit of knowledge-based innovation. But doing no harm to research subjects and contributing to the economy do not exhaust the concept of responsibility, and Calhoun and Washburn also seem motivated by the belief that universities have such broader responsibilities.

What universities lack in pursuit of these broader responsibilities, however, is an institutional platform akin to Offices of Technology Transfer and Institutional Review Boards. As I have argued elsewhere, universities should create what I call Centers for Responsible Innovation (CRIs) to advance the agenda of more responsible knowledge-based innovation.

CRIs would advance an alternative logic of interests in at least three ways: first, they would provide a coherent focus and resource base on campus for scholars in the social sciences and humanities for research, education, and service in the normative dimensions of knowledge-based innovation. Although many universities have curricula in such related areas as Science, Technology, and Society, or Science and Technology Studies, or Bioethics, few have significant research programs in these areas. Even fewer tie research and educational activities together with service and outreach to demonstrate the value of such programs to public officials and the general public. And still fewer conceive

of their mission as providing collaboration, commentary, and constructive criticism—that is, reflexive input—for their university’s own science and engineering programs.

Second, CRIs would give a competitive advantage to natural scientists and engineers who allied themselves with its programs, as a whole array of government and professional groups are asking for more explicit attention to ethical, legal, and social implications (ELSI) in scientific work. This encouragement began, in a fashion, with requirements by the National Institutes of Health, following a series of high-profile cases of scientific misconduct, that NIH training programs include training in scientific integrity. It continued with the expansion of programs at NIH and the National Science Foundation into ELSI research on genome science, into undergraduate and graduate training in science and engineering ethics, and most recently into Social and Ethical Implications of Nanotechnology (SEIN). It has also been embedded in NSF’s peer review of grant applications by what is known as “criterion two,” the second of two evaluation criteria used for all applications which emphasizes the broader impacts of the proposed research. Even professional societies have supported this shift, particularly the Accreditation Board for Engineering and Technology (ABET), which accredits undergraduate engineering degrees and now includes ethics training in its accrediting criteria.

Third, once enough CRIs were established, they could begin to constitute an interest group in the way that technology transfer personnel, who have formed the Association of University Technology Managers (AUTM), do. AUTM’s members produce, and their association provides, the data about the economic contributions of technology transfer from universities to the private sector—and the contributions are impressive, particularly to state governments. Although analysis about revenue and jobs framed quantitatively is certainly going to be more salient and persuasive than other types of analysis in policy circles, there is no similar capacity among universities to engage in critical reflection and analysis about their own roles in making less market-oriented contributions to society. (It is not clear, for example, that the major higher education lobbies, e.g., the Association of American Universities or the National Association of State Universities and Land-Grant Colleges, have the capacity or credibility to make such arguments, especially absent a force like that advocated here in competition, as it were, with AUTM.)

At Arizona State University, my current institution, the Consortium for Science, Policy, and Outcomes (CSPO) provides preliminary proof of concept for many of the ideas behind the CRI proposal. In the context of

what ASU president Michael Crow calls “a new American research university,” which demonstrates its societal responsibilities by attention to its economic contributions (to the chagrin of some on campus) as well as a broader commitment to scholarship in service to society, CSPO pursues a research, teaching, and service agenda aimed at getting the most and best societal benefit out of knowledge-based innovation. CSPO directs its analysis and interventions at science policymakers but also at research scientists and engineers, collaborating with the latter to add societal implications components to natural science research and training proposals.

One of CSPO’s major projects is the Center for Nanotechnology in Society at ASU, which NSF has funded at \$6.2 million over five years as part of its SEIN program. CNS-ASU is implementing collaborative programs with nano-scale scientists and engineers to push consideration of the societal implications of nanotechnology further upstream, into the knowledge-production portion of the innovation process. It is also reaching out to lay-citizens so that they can engage with bench scientists in the hopes that both groups not only come to understand the values that each brings to understanding and promoting research, but also that they can engage in searching deliberation about those values, opening up the chance for more comprehensive and subtle understanding and adjustment. Such activities, when coupled with a set of fundamental and applied research projects on nanotechnology, opens up an additional chance for anticipating some societal implications of nanotechnology and steering the innovation process in response.

I hope that Calhoun will not find these recommendations “surprisingly modest,” but he may find them contrary to his hope that “science or the university can sustain the autonomy needed to function effectively.” Yet, in response to Washburn, he does argue that universities “cannot expect the massive resources without questions about ‘to what end?’ and ‘for whom?’” Leveraging intellectual property for the public good and creating Centers for Responsible Innovation can help universities answer such questions. The “implicit bargain” that Calhoun acknowledges has not been upheld well by university science cannot be revived implicitly. It needs to be reconstituted explicitly in a new relationship I have elsewhere called “collaborative assurance,” in which both sides recognize that they each have a stake in the integrity and productivity of knowledge-based innovation, and in which they join together in steps to reinforce its responsible pursuit. The ultimate question in this framing is not, as Calhoun concludes, one of how science is organized such that scientists can “prosper and gain the other resources and rewards they

value,” but rather the less self-interested one of how society and its scientific institutions are organized such that science can make the most useful and responsible contribution to the public good.

FURTHER READINGS

Guston, David H. 2000. *Between Politics and Science: Assuring the Integrity and Productivity of Research*. New York: Cambridge University Press.

Stein, Donald, ed. *Buying in or Selling Out: Essays in the Commercialization of the American Research University*. New Brunswick, NJ: Rutgers University Press.

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