Technological Ethics in University-Industry Partnerships: The Best of Both Worlds?

PAUL B. THOMPSON
Michigan State University
East Lansing, MI

Broadly conceived, ethics is the study and review of whether any given practice is good or bad, right or wrong, justifiable or unjustifiable in a given set of circumstances. NABC 18 has explored a number of practices for linking scientific research with private enterprise. The fact that conferences are being held to explore ways to do this suggests that somebody thinks that this is a good thing to do. An ethical analysis of establishing closer ties between academic researchers and commercial technology providers needs to delve into those reasons and subject them to some critical discussion.

The current opinion and analysis on whether such partnerships are justifiable tends to make one of two framing assumptions. On one side, there is the view that society needs more efficient ways to deliver the benefits of publicly funded research to the public that funded it. Here, better (which usually means more extensive) linkages between academics and industry are promoted with the idea that for-profit firms are best able to make scientific discovery available for public use and consumption. This point of view led to the passage of the Bayh-Dole Act (PL 96-517) in 1980 and has been articulated explicitly as the basis for linking university research to state and national economic development.

On the other side is the view that science should be separated from profit-seeking technology development. Some people who hold this view prefer socialist political schemes and presume that pursuit of profit is intrinsically problematic. Others who make this criticism make one of two arguments to support the more subtle view that while capitalism is a legitimate form of society, some aspects of science should be isolated from capital. One argument stresses the public's need for unbiased sources of information and expertise in order to bring about democratic governance, and interprets links between public-sector research and venture-capital investment as compromising the ability of university, government and non-profit scientific research to fill this need (Krimsky, 2003). The other argument stresses the need for public disclosure and reproducibility within the research process itself. This view suggests that pressures to seek commercializable results and the secrecy that accompanies proprietary technology will ultimately lead to the weakening of science as a knowledge-seeking social institution (Busch *et al.*, 1991).

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While I am certainly willing to undertake the task of pursuing these assumptions to some degree, I want to suggest a somewhat different way to focus our deliberations. Let me begin with a bold conjecture, one for which I can offer no data and that will be contrary to the biases of many people: Technological ethics are today better served in the private sector than in the universities. If my conjecture is correct, university/industry partnerships could have the result of improving the capacity for university-based science to address ethical issues, if they bring some of the norms and practices that are commonplace in the private sector into the university. Or they could have the result of transferring the relatively weak performance of university science to the private sector. While we can hope for the better outcome, my conjecture is that university/industry partnerships are likely to produce the worse one. But first I must say a bit more about what I mean by technological ethics.

WHAT IS TECHNOLOGICAL ETHICS?

Although there is no widespread consensus on what technological ethics involves, I am thinking about proposals made by the philosopher Hans Jonas in the 1970s and 1980s. Jonas began by making two very straightforward observations. First, he noted that the nature, rate and scope of technological innovation had been gradually increasing for at least 200 years. By the time that Jonas wrote his original German text some 30 years ago, it was no longer plausible to think that changes in technology could be treated as something like an act of God: relatively rare and beyond the ability of human beings to contemplate. Instead, Jonas argued that that technology had reached a point where humanity *could* and *should* engage in deliberate choices about the future direction that technical innovation should take (Jonas, 1984).

Jonas was not suggesting that we have the ability to predict the future in detail, nor was he suggesting that we could determine the likely social or ecological impacts that would follow from discoveries in basic science. Instead, he was saying that cumulative experience with technical change and our increasing ability to model and forecast social and ecological trends establish a basis for social decision-making about which specific technologies to develop and implement, as well as how to regulate technological risk. I have often heard scientists object to this proposal by saying that it is just not possible to project the consequences of a scientific discovery. But Jonas was not claiming an ability to foresee the consequences of technological innovation that exceeds foresight commonly exercised by private firms and venture capitalists, who routinely *do* make decisions about which technologies to develop and implement.

If there is anything truly controversial in Jonas's observation, it is that there should be *social* decision-making about the ends-in-view that guide such choices. This is a point

that I will, of necessity, leave somewhat undeveloped in the balance of my remarks. I accept the validity of allowing capital markets to suffice for some forms of social decision-making. Nevertheless, I also endorse the need for deliberative public and quasi-public forums in which constituencies excluded from capital markets can have a voice. Further specification of the means for social decision-making is one of the key problems in technological ethics.

Jonas's second observation concerns the nature of ethics. He claims that our current understanding of responsibility remains trapped in the village mentality of the eighteenth century. I believe that he has several related points in mind. Most importantly, we work with a conception of moral agency that presumes individually initiated actions having impacts that are limited to village-sized temporal and spatial scales. In fact, the acts that need to be brought under an ethic of responsibility are seldom initiated by a single individual. They are the cumulative and corporate result of many people acting in organized fashion, often under the guidance of corporate decision-making structures. When I use the word "corporate" here, I do not necessarily mean multi-national or even business corporations. The point calls attention to organized, coordinated and at least partially controllable forms of collective action, as distinct from mob rule or the purely coincidental cumulative consequences of people acting in haphazard fashion (French, 1984).

Modern technology development may not be orchestrated or bureaucratically governed in its details, but it is not haphazard. Practices of peer review in the applied sciences, tenure and promotion in universities, and grant-making by government and foundations join with somewhat bureaucratically controlled forms of R&D to generate a truly corporate form of action. Furthermore, these corporate acts involve the development and dissemination of new technology with spatial consequences that are global, affecting many people who are entirely unknown and even unknowable to the actors. As such, a conception of ethics that is grounded in personal loyalties based on face-to-face reciprocity established among neighbors and townsmen is increasingly inadequate. In addition, effects may be cumulative and latent, affecting people in the distant future. Traditional ethics was keyed to forms of action where impacts would be felt by people known to one another within a time-frame that allowed one to link cause and effect in rather intuitive fashion.

Jonas's point was that our working notion of ethical responsibility is simply out of sync with this new reality. While people of today may have the same desire to be ethically responsible as people in the past, the functional outcome of acting according to norms that emphasize personal loyalty and reciprocity is not the same as what it was in the past.

On the one hand, technological ethics is the organized and thoughtful exercise of foresight and deliberative choice in selecting projects for applied science and technical innovation. This involves utilizing the limited but hardly inconsequential powers of foresight we possess in an effort to innovate and validate new ethical understandings capable of guiding our technology. On the other hand, technological ethics is an effort in public scholarship aimed at understanding and addressing the conceptual, organizational and practical obstacles encountered in making such choices.

As an academic philosopher, I see myself working in this tradition of public scholarship. While predictive power is clearly one aspect of technological ethics, the philosophical

piece involves our understanding of fairly basic ideas such as "action," "responsibility," and "democracy," as well as a more explicitly articulated vision of the future that we collectively desire. Different conceptualizations of these basic elements can lead to striking differences in the way that one characterizes risk and risk-management. As such, there is always opportunity to discuss and debate how risks should be characterized in a given case, and such debates have been the main substance of technological ethics for agricultural biotechnology, (Thompson, 1997, 2003).

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Ethics in Industry and University Settings

My bold conjecture is that scientists, engineers and business leaders working in the private sector have done a much better job of implementing technological ethics as a practical activity than have scientists, engineers and administrators in universities and public-sector laboratories. Rather than pretending to have data that support this conjecture, I will make a brief conceptual argument to illustrate why I think this is the case. One element of this argument stresses the nature of private enterprise and the working environment created within for-profit firms, while the other describes the milieu and culture of university science and engineering departments.

The argument in favor of thinking that people in the private sector do in fact undertake the practical deliberations involved in technological ethics to some degree is fairly simple. First, they are human beings and as such are motivated by the same desires to act ethically and to be seen favorably as all human beings. Historically, people in business have aimed to market products and services that people want and need, and to encourage growth and prosperity in the communities in which they do business and reside. In short, they *intend* their business activities to have effects in these communities, and such intentions are a locus of moral responsibility. Second, the need to gain market acceptance for the goods and services that a business offers, and to have a reputation for quality and reliability, provides a reinforcing incentive for profit-seeking firms to act in an ethical manner. I see no reason to think that people engaged in business are particularly inclined to dismiss or belittle ethical responsibilities simply because they are in business, and every reason to think that they would like to conduct their business affairs, including and especially those involving technical innovations, in an ethically responsible manner.

There are, of course, scam operations that are completely unethical, and they tarnish the very idea of business, but it is important to note that scams are not really business activities at all. Well known structural elements in innovation and profit-seeking enterprise can constrain the ability of legitimate businesses to fulfill ideals of technological ethics, as

well. The most important structural tension for present purposes arises when a product or manufacturing process is seen to have unwanted health or environmental impacts well into the cycle of product development, sometimes long after products have been marketed and utilized by the public. In such situations, the economic incentive switches from being ethical to being secretive and avoiding losses. The chemical and pharmaceutical industries have been especially plagued by well-publicized incidents from thalidomide and Love Canal to Erin Brockovich and Vioxx®. Such incidents reinforce public cynicism about the private sector's commitment to ethics, but they also reinforce the incentives for technological ethics early in the cycle of product development.

As such, I am content to leave my argument with the claim that for-profit enterprises have incentives to engage in technological ethics and that the people working in these firms are motivated to act ethically. I do believe that the private sector has not been as assiduous in utilizing or encouraging public scholarship in technological ethics as it should be, mainly because there is an attempt to rely on the kind of village ethics that Jonas critiques so ably. But that is a matter to which I will return later. The other point that I must make to establish my larger claim is that, quite contrary to those who see university-based science as contributing to democratic governance of science and technology, university science departments have actually not been very good places to pursue technological ethics at all.

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The conceptual argument for this claim is that the incentives in university science and engineering departments are organized around publications, grantsmanship and patents. While university scientists are human beings, they do *not* really intend that their research will have immediate impacts on the communities in which they work and reside, and it is very easy for them to assume that any ethical questions associated with their research will be dealt with by someone else at some other time. These basic incentives of university research have been reinforced by a positivist philosophy of science which holds that statements about values or ethics cannot be subjected to the same standards of validity as statements reporting data or relationships among data, and, as such, have no place in the professional activities of the working scientist. While the hold that this philosophy has over working scientists has weakened significantly over the last 25 years, it continues to provide an obstacle to the practical discussions and deliberations characteristic of technological ethics within the environment of academic science departments, and especially within the training and education of scientists.

Paul Rabinow's study of the biotechnology industry, *Making PCR*, shows that many molecular biologists in the 1980s and 1990s chose industry careers over academic careers precisely because they saw university science departments as incompatible with their values

and resistant to change. The subjects interviewed for this study describe academic science as competitive and obsessed with egotistic gratification and career advancement. They chose industry because the work environment was more cooperative and was dedicated to science in pursuit of environmental and public-health values they held dear. Rabinow's informants also describe biotechnology companies as more accepting of women and minorities than were university science departments (Rabinow, 1996).

There are, of course, many exceptions to these generalizations among individual scientists. I have personally found many molecular biologists and agricultural scientists working in academic settings to be deeply interested in my work on the ethics of agricultural biotechnology, and I have learned a great deal from those individuals who have taken the time to read and criticize my work. Nevertheless, as Robert Zimdahl's new book, *Agriculture's Ethical Horizon*, makes clear, positivist values are still quite prevalent in agricultural science departments. Debate, discussion, teaching and thoughtful deliberation on the ethical dimensions of agricultural science and technology are still the exception to the rule in agricultural universities and government research laboratories (Zimdahl, 2006).

As such, I reiterate my claim that technological ethics are better established in private industry than in academic science. This is not to say, however, that the mode of practice for technological ethics in the biotechnology industry is beyond criticism, nor to imply that university-based technological ethics is wholly inferior. In fact, there are interesting complementarities between the weaknesses in private-sector technological ethics and the strengths of academic approaches. Respective weakness and strength in both cases relates to the role of scholarship in technological ethics, a practice that currently exists primarily in university ethics centers and social science departments, and that is poorly utilized by even industry decision makers who are well-motivated and have economic incentives to understand the likely impacts of and public receptivity to their technologies.

Toward Partnership in Ethics?

University-based scholarship in technological ethics has two important features not typically present in industry settings. One is simply the luxury of expertise. Scholars in technological ethics are professionally devoted to understanding the normative, social and theoretical issues involved in effectively anticipating and understanding the social, economic, cultural and ethical significance of innovation and technical change. They can bring a variety of empirical, comparative and analytic methods to this task. Ironically, the cultivation of expertise can have unfortunate consequences, as academic scholars come to rely on complex and jargon-ridden theoretical models that make it difficult for them to extend the fruits of their studies to an audience with more practical and immediate concerns in mind. In addition, scholars of technological ethics are always at least one step removed from actual decision-making in research and development settings. This distance can be the source of many errors and irrelevancies that make this work less useful to practical application than it might otherwise be. Nevertheless, I believe that those of us who conduct scholarship on technological ethics have learned a few things that would be of use in conducting practical ethical inquiries about which technologies to develop and what applications of science to pursue.

One might argue that the findings of the scholarly community are available to industry on a consulting basis, and this is true. In point of fact, they are freely available as published materials, too, but consulting arrangements may be preferable to decision-makers who are already strapped for time. Here, however, the second limitation of industry-based technological ethics comes to the fore, and it is a limitation that lies at the very heart of the public/private divide. Scholarship on technological ethics is effective to the extent that it is public, meaning that it is freely available for peer commentary and critique, but also that it both is and is seen as a non-strategic activity aimed solely at disclosing the ethics researcher's best guess at ethically correct standards for development, dissemination, adaptation and regulation of new technology. Public criticism and debate over this guess is essential to the method, and this criticism must also be motivated solely by the goal of agreement on the best and ideally operative standards.

While private industry can conduct exercises in ethical deliberation under such idealized conditions as a practice intended to inform their internal decision-making, there are sound business reasons why public disclosure of this process will, on occasion, be constrained by considerations of legal and business strategy. Because everyone understands this, statements and disclosures made by private industry are regarded quite properly as strategic, as intended to manipulate the reaction and posture of others, rather than as trying to articulate the values and reasoning of company decision makers. Only a public activity independent of practical decision-making can provide the environment for legitimate inquiry into technological ethics.

As such, broad public competence in technological ethics, including familiarity with the terms and problems of R&D policy and the socio-cultural significance of technology and technical change depends on the existence of a non-strategic body of scholarship. Such public competence is needed if we are to realize Jonas's goal of social decision-making on technical means. Given currently existing social institutions, universities remain the most likely home for such idealized types of public inquiry, despite the fact that university-based scholarship is vulnerable to the distorting influences I have already mentioned. More intimate and effective insight into ongoing industry problems and practices would clearly strengthen scholarly attempts to understand and respond to technical change. Better communication between scholars and practical decision-makers could improve decision-making. And now it is possible to return at last to the main theme: university/industry partnerships, and the development of innovative institutional settings for scientific work that bridges commercial and academic cultures.

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Given what I have said so far, we might hope that these new ventures would become laboratories for technological ethics, places where the complementary strengths of practical ethics as practiced within industry and scholarly ethics as practiced within universities might be joined, or at least might come close enough together for practitioners on both sides of the public/private divide to peer over the fence and derive mutual benefit. This would indeed be the best of both worlds for technological ethics in university/industry partnerships. It will not happen automatically, however, and will require careful thought and planning as to how the social science and humanities disciplines so critical to scholarship on technological ethics might be integrated into partnership activities.

What is more likely, I fear, is the opposite result, something more like the worst of both worlds. The scientific culture of the academic world that places so little value on reflective deliberation into the ethics of science and technology will dominate the partnership. The imprimatur of university research will substitute for the exercise of technological ethics that currently exists in the private sector, and the industry culture of strategic thinking will pick up the ball after key ethical commitments have been thoughtlessly made. The result will be a series of technical innovations even less subjected to deliberative ethical review and foresight than those of the past. These technologies have the potential to move so quickly into development and regulatory review that no one will have any opportunity to debate their likely impact or acceptability. What is more, as the public becomes wise to the overriding strategic ambitions of these partnerships, the fears of critics who worry that industry links will undermine confidence in science will be realized.

This pessimistic scenario is not the inevitable result of university/industry partnerships, and it may not even be the most likely one. What we will probably get is something more like the *status quo*, with university scientists acting more like businessmen, which in this case is a good thing because it means that there will be some exercise of ethical foresight. Researchers such as me, however, will remain on the margins, or more literally back on the main campus, where we will spend most of our time talking to one another. While there are some more hopeful signs on the horizon—my invitation to speak at this conference being one of them—we will have to wait and see what the individuals who execute these partnering activities actually do.

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PAUL THOMPSON holds the W.K. Kellogg Chair in Agricultural, Food and Community Ethics at Michigan State University in East Lansing, MI. He formerly held positions in philosophy at Texas A&M and Purdue Universities. His research has centered on ethical and philosophical questions associated with agriculture and food, and especially concerning the guidance and development of agricultural technoscience. This research focus has led him to undertake a series of projects on the application of recombinant-DNA techniques to agricultural crops and food animals.

Dr. Thompson published the first book-length philosophical treatment of agricultural biotechnology in 1997, and has traveled the world speaking on the subject. In addition to philosophical outlets, his work on biotechnology has appeared in technical journals including *Plant Physiology, The Journal of Animal Science, Bioscience,* and *Cahiers d'Economie et Sociologie Rurales.* He serves on the US National Research Council's Agricultural Biotechnology Advisory Council and on the Science and Industry Advisory Committee for Genome Canada.

Thompson has published extensively on the environmental and social significance of agriculture. His 1992 book (with four coauthors) on US agricultural policy, *Sacred Cows and Hot Potatoes*, won the American Agricultural Economics Association Award for Excellence in Communication.