

Technology Transfer: What Can Philosophers Contribute?

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Introduction

"Globalization" is a contentious term that refers to integrated changes in culture, economics, the environment, politics, and technology. The term means many things to many people, and it is used to describe extreme and contradictory outcomes, including:

- the final ascendancy of capitalism and Westernization *and* the proof that history has not ended;
- the proliferation of homogeneity *and* the generation of cultural diversity through hybridization;
- the apex of modernization *and* the beginning of a distinctly different "global age";
- the spread of Enlightenment secularization *and* the renewal of religious fundamentalism;
- the engine of economic development that benefits developed and developing countries alike *and* the prime tool that promotes corporate imperialism at the expense of the impoverished;
- the proof for *and* against the thesis of technological determinism, and finally,
- "globalization" is used as the defining concept of contemporary times *and* a term whose scope has been exaggerated and possibly analytically contrived to promote social and political agendas.

One finds many understandings of globalization, in part because it concerns "multi-pronged" and "long term" transformations that originate in practices entailing collaborations over vast geographic distances ("deterritorialization"). These transformations mutually impact local and distant events events ("interconnectedness"), and speed up social activity ("acceleration").

Despite living amid globalization's contentious changes, philosophers are not doing enough to help citizens, policymakers, engineers, and activists address the numerous moral, political, and conceptual problems accompanying technological innovation. This is a serious lapse in professional responsibility. As journalist and historian Thomas Friedman notes, the new

mobile and digital technologies that enable individuals to shape, manipulate, and transmit information at very high speeds and with total ease are the very "steroids" that "amplify" and "turbocharge" globalization's central forces. In other words, as these technologies become integrated into daily routines and become standard equipment in both the private and public spheres, pervasive and multi-faceted change occurs. This realization has led preeminent moral philosopher Albert Borgmann to depict "technology" as the most appropriate focus for framing concentrated and fair discussion of globalization.

Because technology is central to globalization, it is imperative that we come to terms, morally, politically, and conceptually with *technology transfer*, an endeavor that has been at the forefront of development initiatives to aid impoverished countries since the end of World War II. But in order to analyze the central problems that technology transfer poses, a broad definition is in order, as are preliminary considerations about the *digital development* occurring at the cutting-edge of development theory and practice. With this background, one then can review some of the problems that technology transfer has engendered, and briefly consider how "humanitarian engineering" addresses these problems.

Humanitarian engineering, broadly defined, is the use of scientific and technological expertise for the explicit purpose of improving the well-being of underserved populations. The two main goals that humanitarian engineering promotes are preventative humanitarian action and humanitarian development. In light of the pedagogical and theoretical contributions that philosophy can make to humanitarian engineering, particularly with respect to identifying the moral, political, and cultural constraints that can impede its success, I conclude by outlining some of the ways that traditional philosophical biases can be shed in order to better address technology transfer's basic problems and the dilemmas that digital development raises.

Technology Transfer

From a historical perspective, there is nothing new about basic forms of technology transfer. Although the transfer of tools and technical procedures have existed ever since the introduction of commerce, today the phrase “technology transfer” has two dominant meanings. “Technology transfer” can refer to processes of patenting and licensing inventions for the purpose of transforming new scientific discoveries into technological applications and intellectual property. Offices of technology transfer, for example, are charged with this responsibility. Although I do not focus on this aspect of technology transfer, it is worth noting that the topic has received insufficient philosophical reflection despite its significance. Perhaps the most provocative

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analysis can be found in Philip Mirowski’s essay, “The Scientific Dimensions of Social Knowledge and Their Distant Echoes in 20th Century American Philosophy of Science.” Mirowski contends that the most recent historical trend in US science policy—running from the 1980s to the present—is typified by political, economic, and institutional pressures that subordinate scientific research (including inquiry conducted in academic environments) to corporate agendas. Mirowski argues that in order to grasp the complexity and consequences of this trend, it is important to discern how some philosophical depictions of science’s internal culture and values—notably, philosopher Philip Kitcher’s advocacy of “social epistemology”—risks entrenching the interests of global “technology transfer bureaucrats” by unduly supporting, and thereby becoming complicit in, self-serving characterizations of how “science” and “society” fundamentally should relate.

The second meaning of technology transfer refers to development projects that attempt to aid impoverished countries by exporting existing technologies to them. Attempting to catch up to the level of technology present in the US after World War II, European countries tried to acquire the patents, licenses, and know-how that were believed necessary to bridge the technical gap. It was in this context that the phrase “technology transfer” was used for the first time; as the perceived success of this venture, enthusiasm arose for industrial countries to use technology transfer to assist poorer ones.

Under contemporary conditions of globalization, new development practices are emerging, and the ones

that view a central role for mobile digital technologies are routinely praised. To distinguish these endeavors from biotechnological, chemical, and nuclear programs, the phrase “digital development” is sometimes used.

In developing countries, digital development promotes a variety of ends, including assistance in educational, entrepreneurial, and agricultural endeavors. For example:

- Citigroup is introducing biometric ATMs to serve poor communities in India. Because the machines use thumbprints instead of personal identification numbers and voiceover technology instead of written instructions, illiterate customers are acquiring a new way to access their bank accounts.
- The Lamont-Doherty Earth Observatory at Columbia University is trying to reduce exposure to arsenic in Bangladesh by constructing a database, *Welltracker*, which enables users to upload information about water quality across a range of areas directly onto their cell phones.
- The *1 Laptop Per Child Program*, founded by former director of the MIT Media Lab, Nicholas Negroponte, aims to manufacture laptops that can be purchased for \$100. The goal is to distribute these machines to students in developing countries in order to enhance their education.
- The University of California-Davis and Texas A&M University started projects in Afghanistan that use cell phones and spectrometers to provide goat and sheep herders with early warning systems that reveal information about animal health and the location of advantageous grazing areas.

Technology Transfer and Its Discontents

Though the use of technology transfer to aid developing countries and regions has led to some success, it has also proved controversial. The guiding concept of “sustainability” came to be revised repeatedly, and debates raged over the desirability of exporting “appropriate” and “intermediate” technologies instead of “high-tech” machinery. Paradigm cases of unsuccessful technology transfer include the chemical disaster in Bhopal, India, the failure of the Green Revolution in Gorasin, Bangladesh, and the large-scale environmental degradation that has taken place in China.

Far from belonging to a bygone era, failed instances of technology transfer continue to haunt contemporary development efforts. *New York Times* journalist Nicholas Kristof captures the tragedy at issue:

In rural Indonesia, you see a cultural problem that aid can’t easily address: pregnant women and babies going hungry, even having to eat bark from trees, while their husbands are doing fine. It turns out that the custom is for the men and boys to eat their fill first. In Ethiopia, you greet parents cradling

hungry babies and explaining that they have no food because their land is parched and their crops are dying. And two hundred feet away is a lake, but there is no tradition of irrigating land with the lake water, and no bucket; and anyway the men explain that carrying water is women's work. In both cases you can see why many who know about aid say that changing the status and power of women is of prime importance if aid and development are to be effective. But it is far from clear how this can be done.

Discouraged, you move on to southern Africa. You see the very sensible efforts of aid groups to get people to grow sorghum rather than corn, because it is hardier and more nutritious. But local people aren't used to eating sorghum. So aid workers introduce sorghum by giving it out as a relief food to the poor—and then sorghum becomes stigmatized as the poor man's food, and no one wants to have anything to do with it.

You visit an AIDS clinic there, and see the efforts to save babies by using cheap medicines like Nevirapine to block mother-to-child transmission of HIV during pregnancy. Then the clinic gives the women infant formula to take home, so that they don't infect the babies with HIV during breastfeeding. A hundred yards down the road, you see piles of abandoned formula, where the women have dumped it. Any woman feeding her baby formula, rather than nursing directly, is presumed to have tested positive for HIV, and no woman wants that stigma.

Humanitarian Engineering and Philosophy

Motivated in part by failures in technology transfer, the Colorado School of Mines now offers a "humanitarian engineering" program (information can be found at: <http://humanitarian.mines.edu/>). This interdisciplinary program aims to educate engineers to "balance technical excellence, economic feasibility, ethical maturity and cultural sensitivity." Philosophy has a central role in the curriculum, and students can take courses such as "Engineering Ethics" and "Political Philosophy and Engineering."

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Were philosophers willing to turn their attention to issues like technology transfer, more schools could offer robust programs in humanitarian engineering; as a consequence, philosophy could directly impact actual development practice. Unfortunately, at present few philosophers address globalization directly, and those who do tend only to consider technology in abstract terms.

The standard philosophical literature on globalization simply identifies universal standards of justice and

the political norms appropriate for countries (e.g., European Union), institutions (e.g., United Nations and World Bank), and individuals (e.g., duties to donate to international charities and to purchase fair trade goods) to adopt in a "post-nation-state" context. Further, when philosophers of globalization discuss artifacts, they often emphasize aesthetic, not technological, value. One can engage in debates about, for instance, whether justice requires that artworks coercively removed from their countries of origin are to be considered stolen cultural property and repatriated. Even in the cases of artifacts discussed as technological devices or systems, analysis is restricted to the outcomes or general features of technological practice. These high levels of abstraction allow for general points about responsibility and well-being, for example:

- A heightened sense of responsibility exists today because information technologies provide citizens around the world with unprecedented access to real-time information about suffering.
- A heightened sense of responsibility exists today because actions initiated in one part of the world can readily lead to unintended yet dramatic consequences in other parts of the world.
- A duty to use technology to preserve cultural niches exists today because globalization is absorbing cultural particularities and replacing them with uniform norms, tastes, and landmarks.
- Technological practices contribute to environmental degradation, animal suffering, military conflict, and the exploitation of labor in both impoverished and developed regions. Duties to protect the afflicted thus exist.
- Nuclear and chemical weapons threaten the extinction of all life on planet earth. Just war theories and philosophies of peace continue to be pertinent.

Following this trend, the prominent philosopher, legal theorist, and development ethicist Martha Nussbaum uses the "capabilities" approach to human rights to criticize Muslim customs of *purdah* that prevent impoverished women in countries like Bangladesh from working outside of the home. The capabilities approach is a universal ethics that details the basic entitlements that all human beings deserve regardless of where they happen to live. Yet she acknowledges that her analysis is more conducive to identifying violations of justice than determining which jobs and which technologies can best promote just outcomes. Detailing the scope of her inquiry, she includes the following caveat:

I shall not propose a general theory about how the needs revealed by such an assessment should be met: whether by centralized planning, for example, or through a system of incentives, and whether through direct subsidies or through the provision of opportunities for employment.

Although her application of the capabilities approach may articulate the basic features which constitute an ideal conception of empowerment, it does not provide the conceptual tools needed to determine whether those features are being satisfied by a particular instance of development.

In light of such abstract treatment of technology, philosophers can do much more to address the basic problems of technology transfer. As a first step, they need to refine the preliminary analyses of *technological relativity* and the *hermeneutics of indigenous response to technology transfer*.

Technological Relativity

According to the thesis of technological relativity—expressed by philosophical pragmatists such as John Dewey and phenomenologists such as Don Ihde—anthropological and sociological evidence prove that technological activity is both embodied and embedded; it has ineliminable cultural dimensions and is also limited by user constraints. The comprehensive nature of technology thus cannot be grasped by considering only artifacts, technical systems, or engineering principles. These all are proper dimensions of technology, but so too are the background conditions that influence how technologies are personally and collectively experienced in the context of practices. Technology includes skill, knowledge, and technique as well as social and cultural norms. Without the regulating structure of practice, objects that currently qualify as equipment would no longer count, ontologically speaking. Even so-called “found” or “proto” technologies, such as the tubes of grass that chimps use to coax insects out of the ground, require users possessing methods of application that derive from trial-and-error or standardized forms of education.

It is tempting to believe that if a device is used in a simple and widespread context, and if the techniques required for its use are not terribly complex, then the goal of seamless technology transfer is achievable. Likewise, one may hope that technology transfer proves too demanding only when the use of a device is restricted to a local context or involves specialized knowledge that is difficult to master. In practice, however, such considerations prove to be only of limited value. Because technology reflects as well as shapes cultural identity, philosopher Hubert Dreyfus suggests that, for instance, it might be inconceivable to envision the Japanese tea ceremony tradition revolving around efficient, but aesthetically displeasing, and ultimately disposable and interchangeable styrofoam cups. Although ceramic tea cups conserve temperature less well than their plastic proxies, the combination of fine craftsmanship and conscientious care required for preservation allow them to be experienced as not

merely beautiful, but also as socially meaningful. Ceramic tea cups are both appropriate for the occasion and can be heirlooms worthy of being passed across generations. Thus, the nuances of technology transfer cannot be grasped merely by learning which objects are recognizable across cultures, or by discerning how to resolve ergonomic issues.

Although successful technology transfer can occur only through cultural acceptance, it would be a mistake to equate every instance of acceptance with an endorsement of the exporting country’s values and practices. Since new agendas and novel usage can transform artifacts and technical systems into different beings, “integration” can involve “translation”; it need not entail sheer repetition. To this end, further philosophical analysis of integration and translation are called for. By providing it, we all could more clearly understand why indigenous populations need not worry that they will become “Western” simply by adopting Western technology. We could also come to appreciate fully that technology transfer requires concrete considerations of material culture, otherwise technology transfer is reductively portrayed as merely being a “mindset.”

Hermeneutics of Indigenous Response to Technology Transfer

Hermeneutics refers to “interpretation,” and the German philosopher Hans Poser has identified four central hermeneutic considerations that have led some indigenous people to perceive technology transfer as a patronizing endeavor. First, the needs of developing countries have historically been assessed through the prism of the value systems of developed countries. Second, developed countries have historically used a “materialistic way of thinking” consistent with “our scientific tradition” as the basis from which to judge indigenous practices and values. Third, developed countries have historically presupposed that given the benefits of Western knowledge, they can predict the outcomes of technology transfer and reliably “judge which of the possible alternatives” to a technological solution are best. Fourth, developed countries have historically transferred technologies that developing regions are incapable of manufacturing themselves. Obviously, these four considerations are not exhaustive. By creating a more comprehensive hermeneutic taxonomy, the problems that Kristof discusses across a range of instances could be better addressed.

Digital Development

From my perspective, the most perplexing aspect of digital development is that it is widely considered completely beneficial, a process that somehow escapes

all of the problems engendered by traditional forms of technology transfer. For example, in a recent article in *Developments: The International Development Magazine*, a contributor writes:

In rich countries, mobile phones can seem something of a mixed blessing—particularly if you are stuck on a train next to a teenager with a Crazy Frog ring-tone. But in poor countries, mobile phones have no obvious downside and have already delivered remarkable benefits, in terms both of economic growth and personal empowerment. They may even enable poor countries to leapfrog over some of the traditional stages of the development process.

As I see it, it is patronizing to depict developing parts of the world as so desperate that they cannot be negatively affected by any behavioral changes brought about by digital development. Of course, someone skeptical of my position could make the contrary claim, noting that technologies used in digital development programs are novel in their new regions, and perhaps I am being patronizing to criticize technology transfer to developing countries. As a quick reply, let me note that I do not make a blanket criticism of the transfer of technology to any country; what I am claiming, however, is that an ethics of digital development cannot begin from the mindset that mobile phones (and other mobile telecommunications technologies) have “no obvious downside” to developing parts of the world.

It thus would be useful for philosophers to turn their attention to such endeavors as the Village Phone program (henceforth, VP) in Bangladesh. VP emerged from initiatives taken in 1997 by Muhammad Yunus, a Bangladeshi who, in 2006, became the first economist to win the Nobel Peace Prize. The goal of the program is to provide impoverished women who lack collateral with small loans (“micro-credit”) to acquire mobile phones and rent out calling time to fellow villagers. Given the limited number of existing landline phones, coupled with the prohibitive expense that prevents impoverished Bangladeshis from acquiring their own mobile phones, this plan—which also includes an explicit liberal social agenda (referred to as the “Sixteen Decisions”)—is widely viewed an innovative approach to human rights. Rather than relying on traditional political resources, women’s emancipation is pursued through entrepreneurial endeavors (notably, by using technology transfer to generate wealth) that in its broadest terms can be considered as “corporate social responsibility.” Indeed, the GrameenPhone website earnestly characterizes the telephone as a “weapon against poverty,” and the women who participate in the program as “phone ladies” (*phone bibi*; “mobile public call office” is also used).

Although VP continues to receive accolades from a range of developers and development theorists, a debate has arisen about whether Bangladeshi women have actually become empowered by their participa-

tion in VP. The dominant view is that a variety of micro-credit programs, especially VP, do in fact empower impoverished women across the globe. In response to the question of why the Nobel committee selected Yunus, *New York Times* foreign correspondent Celia Dugger thus claims:

It [microcredit] offers hope. It offers, very importantly, empowerment to women. Overwhelmingly these microcredit loans are provided to women who are often quite financially powerless in their families. They often don’t have rights to inherit property, they don’t have bank accounts of their own. So the fact that the woman suddenly has the power to obtain a loan, even a very small loan, can be very important in giving her power and a counterbalance to the appeal of Islamic fundamentalism, which subsumes often the role of women.

It is important to thoughtfully consider whether the dominant representations of microcredit programs, such as the one Dugger presents, are idealizations. Critics allege that scrutiny into how women’s lives change as a result of their participation in the program reveals several issues, including whether or not:

- (1) phone ladies define their own struggles, or whether this program allows men—husbands and bank officers—to further entrench the oppression of women;
- (2) phone ladies gain a measure of respect only because of their enhanced earnings, but still lack genuine solidarity and recognition of their intrinsic dignity;
- (3) the labor required for being a phone lady valorizes women who are silent in the presence of men, whose voices are heard in the room where the phone is used, and potentially across the globe;
- (4) the labor required for being a phone lady is less rewarding than traditional craft labor;
- (5) the lack of basic literacy, much less education in telecommunications, makes phone ladies feel a sense of alienation as they continue to depend on technical experts for repairs and ongoing services;
- (6) phone ladies—and, perhaps women in general—will be blamed if the integration of mobile telecommunications comes to be perceived as inhibiting efforts at promoting literacy; and
- (7) phone ladies—and, perhaps women in general—will be blamed if mobile telecommunications become perceived as responsible for the too radical transformation of traditional culture.

These are only several of the many issues that philosophical analysis of VP must address and help developers and engineers better conceptualize. In so doing, it may be the case that longstanding concepts such as “empowerment” are not appropriate in describing and assessing the benefits and burdens that emerge from participation in digital development. But if philosophers fail to take a more active role in determining the vocabularies appropriate to express the complexities of

globalization, less reflective audiences are given the opportunity to control the “talking points.” We then fail in our duty to help engineers and developers confront the challenges that arise as they engage in well-intentioned, but potentially short-sighted endeavors.

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