

# VIEWPOINT: Offshoring and the Local Ethics of Engineering

by Dr. Joel L. Cuello, Pennsylvania Beta '89

**f**OR ENGINEERS, THE RISE OF a truly global high-tech economy has brought an unexpected twist: the emergence of a global labor force in engineering, science, and other fields requiring advanced degrees. Just as a global market has catalyzed the mass export of products and technologies from highly-developed countries to developing nations, globalization has also catalyzed the export of engineering jobs.

While the principles of free trade and the arguments for protectionism are most commonly deployed by proponents and opponents of offshore outsourcing, respectively, it is possible—indeed expedient—for engineers to view and examine such *offshoring* of jobs along ethical lines. This essay suggests a novel framework of ethical responsibilities, opening important lines of understanding that could prove instrumental in crafting desirable solutions for individuals and companies alike.

## OFFSHORING AND U.S. ENGINEERING

Quite simply, offshoring to India and other low-wage countries has left American engineers dazed, confused, and vexed. Indeed, for U.S. corporations (including Dell, General Electric, IBM, and Texas Instruments), it is now becoming inconceivable to think of a global economy without the offshoring of jobs as well as markets.

Cost reduction is the obvious and preeminent reason.

An experienced software programmer in the United States earning \$75,000 a year, for instance, now can be replaced by an Indian programmer who earns approximately \$15,000 a year.<sup>1</sup> Also, tapping pools of top-notch, well-educated technology workers in low-wage countries has proven to be a windfall for small- and medium-sized U.S. companies, enabling them to compete with big corporations for improved quality and differentiation of products and services in addition to expanded markets.<sup>2</sup>

Splitting advanced projects into pieces is another boon of offshoring, with experts in different countries handling only a piece of the project. Spearheading the trend is IBM. Transitioning from a classic multinational corporation with separate business enterprises in many different countries, IBM is becoming a truly global company whose work can be divided and parceled out to the most efficient locations.<sup>1</sup>

For individual engineers in the U.S. and Europe, however, the offshore outsourcing of technology jobs has been nothing less than agonizing. In 2003, the McKinsey Global Institute reported that over the next three years U.S. offshoring would be expected to grow at 30 to 40 percent a year.<sup>3</sup> Worse, it estimated that more than half (52%) of engineering jobs may be amenable to offshoring over the long term.<sup>4</sup> The information technology (IT) analyst Forrester Research also projects that the number of U.S. jobs offshored will increase roughly to 3.3 million by 2015, accounting for a loss of some \$136 billion in wages.<sup>3</sup> Ahead of



*A truly global technological economy has been a boon to myriads of both national and transnational corporations. But at what cost to local engineers?*

the curve, IBM, the world's largest IT company, anticipated laying off as many as 13,000 workers in Europe and the U.S., while creating 14,000 new jobs in India in 2005.<sup>1</sup>

And this is not the whole story. Citing data for the non-manufacturing sector from 1979 through 1999 as compiled by the U.S. Bureau of Labor Statistics, the McKinsey Global Institute further reports that 31% of workers who lost their jobs through offshoring were not fully reemployed.<sup>5</sup> That statistic was closely mirrored by a finding from the 2004 unemployment survey conducted by the Institute of Electrical and Electronics Engineers (IEEE) employment assistance committee, which reported that 36% of all respondents had indicated that they had yet to find a job.

Worse, two thirds of all respondents to the 2004 survey agreed that finding a new job was very difficult.<sup>6</sup> Consider the following responses: When asked for their perception about the prospects for a long-term demand for engineers in the U.S., only five percent of the respondents described the prospects as *excellent*, while 24% described the prospects as *poor*. When asked if they would recommend engineering as a profession to their sons or daughters, less than a third (27%) of the respondents answered in the affirmative, 32% were not sure, while 41% said they would not recommend engineering at all to their sons or daughters. When asked an open-ended, follow-up question on what IEEE should do to help its unemployed members, the largest group (37%) urged the institute "to do something to protect the supply of domestic engineers. Of these, most wanted the institute to take steps to get [the U.S.] Congress to reduce H-1B visas and stop the [offshore] outsourcing of U.S. jobs."<sup>7</sup>

Indeed, offshoring has put individual engineers in an awkward position. Today it's American electrical engineers versus Indian electrical engineers, American civil engineers versus Filipino civil engineers, and American mechanical engineers versus Chinese mechanical engineers, for instance. Thus, engineers in the developed nations find themselves in uneasy competition with engineers in developing nations with whom they previously shared only mutual regard and solidarity—before the floodgates of offshoring flung open from the United States and Europe.

With the growing concern that sustained offshoring could risk the vitality, if not the viability, of engineering professions in developed nations, how should engineers and engineering professional societies and organizations respond? What principles can be fairly invoked to guide us in facing such a challenge? Should the goal be to restrict offshoring? What effects might it have on a global engineering community?

## LOCAL ETHICS OF ENGINEERING

That the world economy has globalized was aptly captured by an ad campaign, which the car manufacturer Toyota ran in Cambodia 12 years ago:

*"It's the global village. We live here. You do, too. We're neighbors . . . We will do our part to bring the world together by building up the global auto industry . . . For the first half of the century we thought of ourselves as a Japanese company . . . Now we think of ourselves as a world company. Our responsibility is to everyone."* (from *Cambodia Daily*, 7/13/94)

Yet, even as the world reaches out in a global economy, it is simultaneously renegotiating economic and social relations in local communities.<sup>8</sup> Indeed, without the localizing

part, globalization is merely a disembodied ideal. The local ethics of engineering—provide guidance on the interests, conduct, and relations of engineers in local communities within the context of a *global village*. Such a local ethics of engineering encompasses two lines of reasoning: (1) the ethics of identity; and (2) the ethics of efficiency. [The local ethics of engineering as defined here complement the global ethics of engineering (see article on the global ethics of engineering in *THE BENT*, Summer 2003).<sup>9</sup>]

## ETHICS OF IDENTITY

Princeton philosopher Kwame Anthony Appiah has written at length on the ethics of identity. He asserts that one's capacities constitute one's identity—that is, a person constructs his or her identity as a creative response to his or her capacities.<sup>10</sup> Thus, at the core of one's identity are one's unique capacities. In the context of engineering, capacities could mean the unique engineering capacities that constitute specific engineering identities (civil, mechanical, agricultural, electrical, biological).

The notion of a capacity-based identity suggests two basic values that we should strive to preserve: (1) the exercise of those unique capacities (which in the case of engineers directly lead to service for the enhancement of human welfare); and (2) the fostering of solidarity with others possessing the same identity.<sup>10</sup> Hence, having constructed such unique professional identities and made such identities theirs, U.S. engineers owe it to themselves and the public they serve to maintain the exercise of their unique capacities that constitute their identity, sustain their solidarity with others who bear the same identity, and, most important, enable them to serve and enhance human welfare.

## IS OFFSHORING UNETHICAL?

By moving the jobs of certain groups of U.S. engineers, offshoring severely curtails the engineers' exercise of their capacities. Consequently, it undermines their identity (both individual and collective) and their capacity to serve the public.

Thus, based on such an ethics of identity, U.S. engineers have the responsibility—not only to themselves but also to the public they serve—to sustain their capacity-based identity. In the face of offshoring, that responsibility logically calls for defending and preserving the economic conditions that enable and allow them to exercise their capacities locally. Such vital tasks can be most directly accomplished through their working together with policymakers to curb the offshoring of jobs.

And to do so, U.S. engineering societies must take the lead, because they constitute the locus of the collective identity and professional solidarity of their respective members. Truly, a globalizing-localizing world has transformed the current role of engineering societies and organizations. Engineering organizations now must ensure that the economic conditions that enable their members to exercise their capacities are duly preserved. Failure to assume such function will surely imperil not only the livelihood of its members, but also the very future of their professions (and the organizations themselves).

In exploring the relationship between the individual and the state, Appiah invokes the philosopher Isaiah Berlin's concepts of *negative* and *positive* liberties. According

to Berlin, *negative liberty* is protection of the individual from governmental intervention in certain areas of people's lives, and *positive liberty* refers to help from the state and society to enable people to construct and live out an identity.<sup>11</sup> In our age of offshoring, it is no longer an option, but a prime duty of engineering societies, to work together with their governments to secure positive liberty for their members—that is, to engage their governments to enable U.S. engineers to live out their capacity-based identities and to enact pertinent policies to preserve the vitality and viability of their professions.

Why is this so important? Without taking care of and preserving one's capacity-based identity in the local level, one's capacity-based service at the global level is annulled. Expressed positively, it is the fulfilling of one's local responsibilities that leads one to be of service to the rest of the world. This calls to mind Appiah's conception of *rooted cosmopolitanism*, which allows that an appeal to moral universalism does not preclude the legitimacy of allegiance or partiality to certain groups.<sup>12</sup> As Jonathan Freedman of the University of Michigan deduced from this concept, "Without a deeply felt commitment to the local, there can be no genuine sense of obligation to the universal—and vice versa."<sup>13</sup>

It is important to note that in a globalizing-localizing world, the ethics of identity apply not only to local communities of engineers in the United States, but equally to local communities of engineers in India and other low-wage, low-cost countries. Each community owes it to itself to seek to preserve the economic conditions that enable its members to exercise their capacities and thus preserve their capacity-based identities.

#### ETHICS OF EFFICIENCY

The exercise of one's capacities to sustain one's identity must be done efficiently, because the exercise of these capacities is also subject to the influences of circumstances beyond one's control. Real-world circumstances, such as globalization and offshoring, enforce that the exercise of one's capacities must be kept efficient.

What the ethics of efficiency fosters is responsibility for a capacity-based service that maximizes comparative advantage or specialization. Thus, while the ethics of identity is focused on defending and preserving the economic conditions that enable U.S. engineers to exercise their capacities by working with policymakers to curb the offshoring of engineering jobs,



*Many U.S. engineers are tormented by a vague notion that it would be unconscionable and even unethical for them to protest offshoring because it is benefiting people in developing countries.*

*Two facts should dispel such notion: (1) the global open market operates by managed trade, not by free-market free trade; and (2) the local ethical responsibilities that U.S. engineers must themselves fulfill.*

the ethics of efficiency is centered on maximizing the comparative advantage of U.S. engineering through continual retooling or refocusing capacities.

Trade, even of services (or engineering jobs), is not a zero-sum game. A study by the McKinsey Global Institute indicates, for instance, that offshoring creates a net gain for the U.S. economy of 12-14 cents on every dollar offshored.<sup>14</sup> The study also finds that "of the full \$1.45 to \$1.47 of value created globally from offshoring \$1.00 of labor cost, the U.S. captures \$1.12 to \$1.14, while the receiving country captures, on average, just 33 cents."<sup>14</sup> Thus, a certain level of offshoring will likely be considered by some U.S. companies as strategically necessary. That means that U.S. engineers have the paramount responsibility of continually retooling and refocusing their professional capacities to maximize their comparative advantage.

That offshoring both induces increased efficiency and also promotes specialization (i.e., greater comparative advantage) locally was suggested by a recent report by the bureau of labor statistics on the decline in the number of employed U.S. technical workers in six major computer and engineering classifications from 2000-04.<sup>15</sup> The report showed that the largest employment drops for computer programmers (-24%), electrical & electronics engineers (-23%), and computer scientists & systems analysts (-16%) were offset by increases for computer & information systems managers (+48%), computer hardware engineers (+16%), and computer software engineers (+10%). IEEE-USA President Gerard A. Alphonse was quoted as saying that, "The drop in computer programmers and rise in managers reflect the trend toward offshoring of programming jobs and the resulting need for professionals to manage outsourced projects."<sup>15</sup> Offshoring indeed appears to drive job differentiation and specialization based on efficiency and comparative advantage.

Also, the issues of efficiency and comparative advantage in engineering within the context of economic globalization and offshoring carry critical implications for U.S. engineering education. Our engineering schools, as a matter of ethical responsibility, must be aware of and nimbly responsive to global trends and make timely and pertinent adjustments in their curricula with a view to retooling and refocusing engineering capacities for maximizing comparative advantage. An ad recently run by Credit Suisse Asset

Management in the *Financial Times* delivers a fitting message: "Our perspective is global, so we'll never miss a local opportunity."<sup>16</sup>

## OFFSHORING, ETHICS, AND THE FUTURE OF U.S. ENGINEERING

The local ethics of engineering sharply focus on two fundamental truths about offshoring in a global economy: (1) the ethics of identity underscores that offshoring will in all probability remain, but should be curbed through policy; and (2) the ethics of efficiency highlights that the impact of offshoring on engineering employment should be modulated by maximizing the comparative advantage of U.S. engineering through continual retooling and refocusing of its capacities.

Many U.S. engineers are tormented by a vague notion that it would be unconscionable and even unethical for them to protest offshoring because it is benefiting people in developing countries. Two facts should dispel such notion: (1) the global open market operates by managed trade, not by free-market free trade; and (2) the local ethics of engineering presented here draw attention to the local ethical responsibilities that U.S. engineers must themselves fulfill. The fact is that offshoring in its current unrestrained form does constitute a clear and present danger to U.S. engineering. Curbing the currently dizzying rates of offshoring to achieve a workable level of strategic offshoring would be compatible with managed trade and should neither be detrimental to U.S. engineering nor insensitive to America's low-wage, low-cost partner nations.

There are no piece-meal or quick fixes for managing offshoring. More important, it would be naïve for U.S. engineers and their professional societies to think that managed offshoring would simply be served up to them on a silver platter. They must recognize that offshoring builds a strong nexus of interests among America's corporate boardrooms, Wall Street, and the government.<sup>17</sup> Thus, U.S. engineers, with a concerted and concentrated effort, must get to the very roots of offshoring if they truly desire to be effective in curbing and managing its accelerating growth. Indeed, what they need is not the establishment of engineers' unions across the country as some have recommended,<sup>18</sup> but the assembly of a powerful army of engineering lobbyists in Washington, DC. In the face of unrestrained offshoring, deploying such powerful lobbyists in the nation's capital is not only the pragmatic thing to do, but the ethical thing to do—both for the interests of engineers and the long-term interests of the United States.

### References

1. Lohr, S., "At IBM, Cutting Here and Hiring There," *International Herald Tribune*, June 25-26, 2005, p. 15.
2. Zylstra, S.G., "Offshoring is Fundamental," *TEQ Magazine*, May 2004.
3. McKinsey Global Institute, "Offshoring: Is It a Win-Win Game?" San Francisco, CA: McKinsey & Company, Inc., August 2003, p. 7.
4. Colvin, G., "America Isn't Ready," *Fortune*, July 25, 2005, p. 74.



**Joel L. Cuello,** Pennsylvania Beta '89, is an associate professor in the department of agricultural and biosystems engineering at the University of Arizona, where he has been teaching and conducting research in bioprocess engineering

and controlled-environment engineering since 1995. His research topics include biological sensors and alternative energy. He obtained his Ph.D. in agricultural and biological engineering, with a minor in chemical engineering, from the Pennsylvania State University in 1994, and also spent that year as a National Research Council research associate at NASA John F. Kennedy Space Center in Florida. He has recently served as guest co-editor for a special issue of the *International Journal of Engineering Education*. Prof. Cuello can be reached at 507 Shantz Building, University of Arizona, Tucson, AZ 85721; 520/621-7757; fax 520/621-3963; [cuelloj@email.arizona.edu](mailto:cuelloj@email.arizona.edu).

5. McKinsey Global Institute, op. cit., pp. 13-14.
6. Institute of Electrical and Electronics Engineers, 2004 IEEE-USA Unemployment Survey Results, New York, NY: IEEE, November 29, 2004, p. 3.
7. Ibid, p. 4.
8. James, P., *Relating Global Tensions: Modern Tribalism and Postmodern Nationalism*, Department of International Relations, Australian National University, Canberra: National Library of Australia, June 2001, pp. 1-5.
9. Cuello, J.L., "Toward a New Global Ethic for Engineers," THE BENT of Tau Beta Pi, Summer 2003, pp. 36-39.
10. Appiah, K.A., *The Ethics of Identity*, Princeton, NJ: Princeton University Press, 2005, pp. 17-21.
11. Ibid, p. 27.
12. Ibid, pp. 213-272.
13. Freedman, J., "The Ethics of Identity: A Rooted Cosmopolitan," *The New York Times*, June 12, 2005.
14. McKinsey Global Institute, op. cit., p. 12.
15. McManes, C., "U.S. Technical Employment Falls by More Than 220,000 Workers from 2000 to 2004," U.S. News Wire, March 3, 2005.
16. Credit Suisse Asset Management, *Financial Times Weekly Review of the Investment Industry*, June 27, 2005, p. 5.
17. Greider, W., "America's Truth Deficit," *The New York Times OP-ED*, July 18, 2005, p. A23.
18. Boykin, D., "Unions Seek to Add PEs, Other Professionals to Their Ranks," *Engineering Times*, May 2005.