

Offshoring: The Next Industrial Revolution?

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A CONTROVERSY RECONSIDERED

In February 2004, when N. Gregory Mankiw, a Harvard professor then serving as chairman of the White House Council of Economic Advisers, caused a national uproar with a "textbook" statement about trade, economists rushed to his defense. Mankiw was commenting on the phenomenon that has been clumsily dubbed "offshoring" (or "offshore outsourcing") -- the migration of jobs, but not the people who perform them, from rich countries to poor ones. Offshoring, Mankiw said, is only "the latest manifestation of the gains from trade that economists have talked about at least since Adam Smith. ... More things are tradable than were tradable in the past, and that's a good thing." Although Democratic and Republican politicians alike excoriated Mankiw for his callous attitude toward American jobs, economists lined up to support his claim that offshoring is simply international business as usual.

Their economics were basically sound: the well-known principle of comparative advantage implies that trade in new kinds of products will bring overall improvements in productivity and well-being. But Mankiw and his defenders underestimated both the importance of offshoring and its disruptive effect on wealthy countries. Sometimes a quantitative change is so large that it brings about qualitative changes, as offshoring likely will. We have so far barely seen the tip of the offshoring iceberg, the eventual dimensions of which may be staggering.

To be sure, the furor over Mankiw's remark was grotesquely out of proportion to the current importance of offshoring, which is still largely a prospective phenomenon. Although there are no reliable national data, fragmentary studies indicate that well under a million service-sector jobs in the United States have been lost to offshoring to date. (A million seems impressive, but in the gigantic and rapidly churning U.S. labor market, a million jobs is less than two weeks' worth of normal gross job losses.) However, constant improvements in technology and global communications virtually guarantee that the future will bring much more offshoring of "impersonal services" -- that is, services that can be delivered electronically over long distances with little or no degradation in quality.

That said, we should not view the coming wave of offshoring as an impending catastrophe. Nor should we try to stop it. The normal gains from trade mean that the world as a whole cannot lose from increases in productivity, and the United States and other industrial countries have not only weathered but also benefited from comparable changes in the past. But in order to do so again, the governments and societies of the developed world must face up to the massive, complex, and multifaceted challenges that offshoring will bring. National data systems, trade policies, educational systems, social welfare programs, and politics all must adapt to new realities. Unfortunately, none of this is happening now.

MODERNIZING COMPARATIVE ADVANTAGE

Countries trade with one another for the same reasons that individuals, businesses, and regions do: to exploit their comparative advantages. Some advantages are "natural": Texas and Saudi Arabia sit atop massive deposits of oil that are entirely lacking in New York and Japan, and nature has conspired to make Hawaii a more attractive tourist destination than Greenland. There is not much anyone can do about such natural advantages.

But in modern economies, nature's whimsy is far less important than it was in the past. Today, much comparative advantage derives from human effort rather than natural conditions. The concentration of computer companies around Silicon Valley, for example, has nothing to do with bountiful natural deposits of silicon; it has to do with Xerox's fabled Palo Alto Research Center, the proximity of Stanford University, and the arrival of two young men named Hewlett and Packard. Silicon Valley could have sprouted up elsewhere.

One important aspect of this modern reality is that patterns of man-made comparative advantage can and do change over time. The economist Jagdish Bhagwati has labeled this phenomenon "kaleidoscopic comparative advantage," and it is critical to understanding offshoring. Once upon a time, the United Kingdom had a comparative advantage in textile manufacturing. Then that advantage shifted to New England, and so jobs were moved from the United Kingdom to the United States. Then the comparative advantage shifted once again -- this time to the Carolinas -- and jobs migrated south within the United States. Now the comparative advantage in textile manufacturing resides in China and other low-wage countries, and what many are wont to call "American jobs" have been moved there as a result.

Of course, not everything can be traded across long distances. At any point in time, the available technology -- especially in transportation and communications -- largely determines what can be traded internationally and what cannot. Economic theorists accordingly divide the world's goods and services into two bins: tradable and nontradable. Traditionally, any item that could be put in a box and shipped (roughly, manufactured goods) was considered tradable, and anything that could not be put in a box (such as services) or was too heavy to ship (such as houses) was thought of as nontradable. But because technology is always improving and transportation is becoming cheaper and easier, the boundary between what is tradable and what is not is constantly shifting. And unlike comparative advantage, this change is not kaleidoscopic; it moves in only one direction, with more and more items becoming tradable.

The old assumption that if you cannot put it in a box, you cannot trade it is thus hopelessly obsolete. Because packets of digitized information play the role that boxes used to play, many more services are now tradable and many more will surely become so. In the future, and to a great extent already, the key distinction will no longer be between things that can be put in a box and things that cannot. Rather, it will be between services that can be delivered electronically and those that cannot.

THE THREE INDUSTRIAL REVOLUTIONS

Adam Smith wrote *The Wealth of Nations* in 1776, at the beginning of the first Industrial Revolution. Although Smith's vision was extraordinary, even he did not imagine what was to come. As workers in the industrializing countries migrated from farm to factory, societies were transformed beyond recognition. The shift was massive. It has been estimated that in 1810, 84 percent of the U.S. work force was engaged in agriculture, compared to a paltry 3 percent in manufacturing. By 1960, manufacturing's share had risen to almost 25 percent and

agriculture's had dwindled to just 8 percent. (Today, agriculture's share is under 2 percent.) How and where people lived, how they educated their children, the organization of businesses, the forms and practices of government -- all changed dramatically in order to accommodate this new reality.

Then came the second Industrial Revolution, and jobs shifted once again -- this time away from manufacturing and toward services. The shift to services is still viewed with alarm in the United States and many other rich countries, where people bemoan rather than welcome the resulting loss of manufacturing jobs. But in reality, new service-sector jobs have been created far more rapidly than old manufacturing jobs have disappeared. In 1960, about 35 percent of nonagricultural workers in the United States produced goods and 65 percent produced services. By 2004, only about one-sixth of the United States' nonagricultural jobs were in goods-producing industries, while five-sixths produced services. This trend is worldwide and continuing. Between 1967 and 2003, according to the Organization for Economic Cooperation and Development, the service sector's share of total jobs increased by about 19 percentage points in the United States, 21 points in Japan, and roughly 25 points in France, Italy, and the United Kingdom.

We are now in the early stages of a third Industrial Revolution -- the information age. The cheap and easy flow of information around the globe has vastly expanded the scope of tradable services, and there is much more to come. Industrial revolutions are big deals. And just like the previous two, the third Industrial Revolution will require vast and unsettling adjustments in the way Americans and residents of other developed countries work, live, and educate their children.

But a bit of historical perspective should help temper fears of offshoring. The first Industrial Revolution did not spell the end of agriculture, or even the end of food production, in the United States. It just meant that a much smaller percentage of Americans had to work on farms to feed the population. (By charming historical coincidence, the actual number of Americans working on farms today -- around 2 million -- is about what it was in 1810.) The main reason for this shift was not foreign trade, but soaring farm productivity. And most important, the massive movement of labor off the farms did not result in mass unemployment. Rather, it led to a large-scale reallocation of labor to factories.

Similarly, the second Industrial Revolution has not meant the end of manufacturing, even in the United States, which is running ahead of the rest of the world in the shift toward services. The share of the U.S. work force engaged in manufacturing has fallen dramatically since 1960, but the number of manufacturing workers has declined only modestly. Three main forces have driven this change. First, rising productivity in the manufacturing sector has enabled the production of more and more goods with less and less labor. Second, as people around the world have gotten richer, consumer tastes have changed, with consumers choosing to spend a greater share of their incomes on services (such as restaurant meals and vacations) and a smaller share on goods (such as clothing and refrigerators). Third, the United States now imports a much larger share of the manufactured goods it consumes than it did 50 years ago. All told, the share of manufacturing in U.S. GDP declined from a peak near 30 percent in 1953 to under 13 percent in 2004. That may be the simplest quantitative indicator of the massive extent of the second Industrial Revolution to date. But as with the first Industrial Revolution, the shift has not caused widespread unemployment.

The third Industrial Revolution will play out similarly over the next several decades. The kinds of jobs that can be moved offshore will not disappear entirely from the United States or other rich countries, but their shares of the work force will shrink dramatically. And this reduction will transform societies in many ways, most of them hard to foresee, as workers in rich countries find other things to do. But just as with the first two industrial revolutions, massive offshoring will not lead to massive unemployment. In fact, the world gained enormously from the first two industrial revolutions, and it is likely to do so from the third -- so long as it makes the necessary economic and social adjustments.

THIS TIME IT'S PERSONAL

What sorts of jobs are at risk of being offshored? In the old days, when tradable goods were things that could be put in a box, the key distinction was between manufacturing and nonmanufacturing jobs. Consistent with that, manufacturing workers in the rich countries have grown accustomed to the idea that they compete with foreign labor. But as the domain of tradable services expands, many service workers will also have to accept the new, and not very pleasant, reality that they too must compete with workers in other countries. And there are many more service than manufacturing workers.

Many people blithely assume that the critical labor-market distinction is, and will remain, between highly educated (or highly skilled) people and less-educated (or less-skilled) people -- doctors versus call-center operators, for example. The supposed remedy for the rich countries, accordingly, is more education and a general "upskilling" of the work force. But this view may be mistaken. Other things being equal, education and skills are, of course, good things; education yields higher returns in advanced societies, and more schooling probably makes workers more flexible and more adaptable to change. But the problem with relying on education as the remedy for potential job losses is that "other things" are not remotely close to equal. The critical divide in the future may instead be between those types of work that are easily deliverable through a wire (or via wireless connections) with little or no diminution in quality and those that are not. And this unconventional divide does not correspond well to traditional distinctions between jobs that require high levels of education and jobs that do not.

A few disparate examples will illustrate just how complex -- or, rather, how untraditional -- the new divide is. It is unlikely that the services of either taxi drivers or airline pilots will ever be delivered electronically over long distances. The first is a "bad job" with negligible educational requirements; the second is quite the reverse. On the other hand, typing services (a low-skill job) and security analysis (a high-skill job) are already being delivered electronically from India -- albeit on a small scale so far. Most physicians need not fear that their jobs will be moved offshore, but radiologists are beginning to see this happening already. Police officers will not be replaced by electronic monitoring, but some security guards will be. Janitors and crane operators are probably immune to foreign competition; accountants and computer programmers are not. In short, the dividing line between the jobs that produce services that are suitable for electronic delivery (and are thus threatened by offshoring) and those that do not does not correspond to traditional distinctions between high-end and low-end work.

The fraction of service jobs in the United States and other rich countries that can potentially be moved offshore is certain to rise as technology improves and as countries such as China and India continue to modernize, prosper, and educate their work forces. Eventually, the number of service-sector jobs that will be vulnerable to competition from abroad will likely

exceed the total number of manufacturing jobs. Thus, coping with foreign competition, currently a concern for only a minority of workers in rich countries, will become a major concern for many more.

There is currently not even a vocabulary, much less any systematic data, to help society come to grips with the coming labor-market reality. So here is some suggested nomenclature. Services that cannot be delivered electronically, or that are notably inferior when so delivered, have one essential characteristic: personal, face-to-face contact is either imperative or highly desirable. Think of the waiter who serves you dinner, the doctor who gives you your annual physical, or the cop on the beat. Now think of any of those tasks being performed by robots controlled from India -- not quite the same. But such face-to-face human contact is not necessary in the relationship you have with the telephone operator who arranges your conference call or the clerk who takes your airline reservation over the phone. He or she may be in India already.

The first group of tasks can be called personally delivered services, or simply personal services, and the second group impersonally delivered services, or impersonal services. In the brave new world of globalized electronic commerce, impersonal services have more in common with manufactured goods that can be put in boxes than they do with personal services. Thus, many impersonal services are destined to become tradable and therefore vulnerable to offshoring. By contrast, most personal services have attributes that cannot be transmitted through a wire. Some require face-to-face contact (child care), some are inherently "high-touch" (nursing), some involve high levels of personal trust (psychotherapy), and some depend on location-specific attributes (lobbying).

However, the dividing line between personal and impersonal services will move over time. As information technology improves, more and more personal services will become impersonal services. No one knows how far this process will go. Forrester Research caused a media stir a few years ago by estimating that 3.3 million U.S. service-sector jobs will move offshore by 2015, a rate of about 300,000 jobs per year. That figure sounds like a lot until you realize that average gross job losses in the U.S. labor market are more than 500,000 in the average week. In fact, given the ample possibilities for technological change in the next decade, 3.3 million seems low. So do the results of a 2003 Berkeley study and a recent McKinsey study, both of which estimated that 11 percent of U.S. jobs are at risk of being offshored. The Berkeley estimate came from tallying up workers in "occupations where at least some [offshoring] has already taken place or is being planned," which means the researchers considered only the currently visible tip of the offshoring iceberg. The future will reveal much more.

To obtain a ballpark figure of the number of U.S. jobs threatened by offshoring, consider the composition of the U.S. labor market at the end of 2004. There were 14.3 million manufacturing jobs. The vast majority of those workers produced items that could be put in a box, and so virtually all of their jobs were potentially movable offshore. About 7.6 million Americans worked in construction and mining. Even though these people produced goods, not services, their jobs were not in danger of moving offshore. (You can't hammer a nail over the Internet.) Next, there were 22 million local, state, and federal government jobs. Even though many of these jobs provide impersonal services that need not be delivered face to face, hardly any are candidates for offshoring -- for obvious political reasons. Retail trade employed 15.6 million Americans. Most of these jobs require physical presence, although online retailing is increasing its share of the market, making a growing share of retail jobs vulnerable to offshoring as well.

Those are the easy cases. But the classification so far leaves out the majority of private-service jobs -- some 73.6 million at the end of 2004. This extremely heterogeneous group breaks down into educational and health services (17.3 million), professional and business services (16.7 million), leisure and hospitality services (12.3 million), financial services (8.1 million), wholesale trade (5.7 million), transportation (4.3 million), information services (3.2 million), utilities (0.6 million), and "other services" (5.4 million). It is hard to divide such broad job categories into personal and impersonal services, and it is even more difficult to know what possibilities for long-distance electronic delivery the future will bring. Still, it is possible to get a rough sense of which of these jobs may be vulnerable to offshoring.

The health sector is currently about five times as large as the educational sector, and the vast majority of services in the health sector seem destined to be delivered in person for a very long time (if not forever). But there are exceptions, such as radiology. More generally, laboratory tests are already outsourced by most physicians. Why not out of the country rather than just out of town? And with a little imagination, one can envision other medical procedures being performed by doctors who are thousands of miles away. Indeed, some surgery has already been performed by robots controlled by doctors via fiber-optic links.

Educational services are also best delivered face to face, but they are becoming increasingly expensive. Electronic delivery will probably never replace personal contact in K-12 education, which is where the vast majority of the educational jobs are. But college teaching is more vulnerable. As college tuition grows ever more expensive, cheap electronic delivery will start looking more and more sensible, if not imperative.

The range of professional- and business-service jobs includes everything from CEOs and architects to typists and janitors -- a heterogeneous lot. That said, in scanning the list of detailed subcategories, it appears that many of these jobs are at least potentially offshorable. For example, future technological developments may dictate how much accounting stays onshore and how much comes to be delivered electronically from countries with much lower wages.

The leisure and hospitality industries seem much safer. If you vacation in Florida, you do not want the beachboy or the maid to be in China. Reservation clerks can be (and are) located anywhere. But on balance, only a few of these jobs can be moved offshore.

Financial services, a sector that includes many highly paid jobs, is another area where the future may look very different from the present. Today, the United States "onshores" more financial jobs (by selling financial services to foreigners) than it offshores. Perhaps that will remain true for years. But improvements in telecommunications and rising educational levels in countries such as China and, especially, India (where many people speak English) may change the status quo dramatically.

Wholesale trade is much like retail trade, but with a bit less personal contact and thus somewhat greater potential for offshoring. The same holds true for transportation and utilities. Information-service jobs, however, are the quintessential types of jobs that can be delivered electronically with ease. The majority of these jobs are at risk. Finally, the phrase "other services" is not very informative, but detailed scrutiny of the list (repair and laundry workers appear, for example) reveals that most of these services require personal delivery.

The overall picture defies generalization, but a rough estimate, based on the preceding numbers, is that the total number of current U.S. service-sector jobs that will be susceptible to offshoring in the electronic future is two to three times the total number of current manufacturing jobs (which is about 14 million). That said, large swaths of the U.S. labor market look to be immune. But, of course, no one knows exactly what technological changes the future will bring.

A DISEASE WITHOUT A CURE

One additional piece of economic analysis will complete the story, and in a somewhat worrisome way. Economists refer to the "cost disease" of the personal services as Baumol's disease, after the economist who discovered it, William Baumol. The problem stems from the fact that in many personal services, productivity improvements are either impossible or highly undesirable. In the "impossible" category, think of how many musician hours it took to play one of Mozart's string quartets in 1790 versus in 1990, or how many bus drivers it takes to get children to school today versus a generation ago. In the "undesirable" category, think of school teachers. Their productivity can be increased rather easily: by raising class size, which squeezes more student output from the same teacher input. But most people view such "productivity improvements" as deteriorations in educational quality, a view that is well supported by research findings. With little room for genuine productivity improvements, and with the general level of real wages rising all the time, personal services are condemned to grow ever more expensive (relative to other items) over time. That is the essence of Baumol's disease.

No such problem besets manufacturing. Over the years, automakers, to take one example, have drastically reduced the number of labor hours it takes to build a car -- a gain in productivity that has not come at the expense of quality. Here once again, impersonal services are more like manufactured goods than personal services. Thanks to stunning advances in telecommunications technology, for example, your telephone company now handles vastly more calls with many fewer human operators than it needed a generation ago. And the quality of telephony has improved, not declined, as its relative price has plummeted.

The prediction of Baumol's disease -- that the prices of personal services (such as education and entertainment) will rise relative to the prices of manufactured goods and impersonal services (such as cars and telephone calls) -- is borne out by history. For example, the theory goes a long way toward explaining why the prices of health care and college tuition have risen faster than the consumer price index for decades.

Constantly rising relative prices have predictable consequences. Demand curves slope downward -- meaning that the demand for an item declines as its relative price rises. Applied in this context, this should mean decreasing relative demand for many personal services and increasing relative demand for many goods and impersonal services over time. The main exceptions are personal services that are strong "luxury goods" (as people get richer, they want relatively more of them) and those few goods and impersonal services that economists call "inferior" (as people get richer, they want fewer of them).

Baumol's disease connects to the offshoring problem in a rather disconcerting way. Changing trade patterns will keep most personal-service jobs at home while many jobs producing goods and impersonal services migrate to the developing world. When you add to that the likelihood that the demand for many of the increasingly costly personal services is destined to shrink

relative to the demand for ever-cheaper impersonal services and manufactured goods, rich countries are likely to have some major readjustments to make. One of the adjustments will involve reallocating labor from one industry to another. But another will show up in real wages. As more and more rich-country workers seek employment in personal services, real wages for those jobs are likely to decline, unless the offset from rising demand is strong enough. Thus, the wage prognosis is brighter for luxury personal-service jobs (such as plastic surgery and chauffeuring) than for ordinary personal-service jobs (such as cutting hair and teaching elementary school).

IS FOREWARNED FOREARMED?

What is to be done about all of this? It is easier to describe the broad contours of a solution than to prescribe specific remedies. Indeed, this essay is intended to get as many smart people as possible thinking creatively about the problem.

Most obvious is what to avoid: protectionist barriers against offshoring. Building walls against conventional trade in physical goods is hard enough. Humankind's natural propensity to truck and barter, plus the power of comparative advantage, tends to undermine such efforts -- which not only end in failure but also cause wide-ranging collateral damage. But it is vastly harder (read "impossible") to stop electronic trade. There are just too many "ports" to monitor. The Coast Guard cannot interdict "shipments" of electronic services delivered via the Internet. Governments could probably do a great deal of harm by trying to block such trade, but in the end they would not succeed in repealing the laws of economics, nor in holding back the forces of history. What, then, are some more constructive -- and promising -- approaches to limiting the disruption?

In the first place, rich countries such as the United States will have to reorganize the nature of work to exploit their big advantage in nontradable services: that they are close to where the money is. That will mean, in part, specializing more in the delivery of services where personal presence is either imperative or highly beneficial. Thus, the U.S. work force of the future will likely have more divorce lawyers and fewer attorneys who write routine contracts, more internists and fewer radiologists, more salespeople and fewer typists. The market system is very good at making adjustments like these, even massive ones. It has done so before and will do so again. But it takes time and can move in unpredictable ways. Furthermore, massive transformations in the nature of work tend to bring wrenching social changes in their wake.

In the second place, the United States and other rich nations will have to transform their educational systems so as to prepare workers for the jobs that will actually exist in their societies. Basically, that requires training more workers for personal services and fewer for many impersonal services and manufacturing. But what does that mean, concretely, for how children should be educated? Simply providing more education is probably a good thing on balance, especially if a more educated labor force is a more flexible labor force, one that can cope more readily with nonroutine tasks and occupational change. However, education is far from a panacea, and the examples given earlier show that the rich countries will retain many jobs that require little education. In the future, how children are educated may prove to be more important than how much. But educational specialists have not even begun to think about this problem. They should start right now.

Contrary to what many have come to believe in recent years, people skills may become more valuable than computer skills. The geeks may not inherit the earth after all -- at least not the

highly paid geeks in the rich countries. Creativity will be prized. Thomas Friedman has rightly emphasized that it is necessary to steer youth away from tasks that are routine or prone to routinization into work that requires real imagination. Unfortunately, creativity and imagination are notoriously difficult to teach in schools -- although, in this respect, the United States does seem to have a leg up on countries such as Germany and Japan. Moreover, it is hard to imagine that truly creative positions will ever constitute anything close to the majority of jobs. What will everyone else do?

One other important step for rich countries is to rethink the currently inadequate programs for trade adjustment assistance. Up to now, the performance of trade adjustment assistance has been disappointing. As more and more Americans -- and Britons, and Germans, and Japanese -- are faced with the necessity of adjusting to the dislocations caused by offshoring, these programs must become both bigger and better.

Thinking about adjustment assistance more broadly, the United States may have to repair and thicken the tattered safety net that supports workers who fall off the labor-market trapeze -- improving programs ranging from unemployment insurance to job retraining, health insurance, pensions, and right down to public assistance. At present, the United States has one of the thinnest social safety nets in the industrialized world, and there seems to be little if any political force seeking to improve it. But this may change if a larger fraction of the population starts falling into the safety net more often. The corresponding problem for western Europe is different. By U.S. standards, the social safety nets there are broad and deep. The question is, are they affordable, even now? And if so, will they remain affordable if they come to be utilized more heavily?

To repeat, none of this is to suggest that there will be massive unemployment; rather, there will be a massive transition. An effective safety net would ease the pain and, by so doing, speed up the adjustment.

IMPERFECT VISION

Despite all the political sound and fury, little service-sector offshoring has happened to date. But it may eventually amount to a third Industrial Revolution, and industrial revolutions have a way of transforming societies.

That said, the "threat" from offshoring should not be exaggerated. Just as the first Industrial Revolution did not banish agriculture from the rich countries, and the second Industrial Revolution has not banished manufacturing, so the third Industrial Revolution will not drive all impersonal services offshore. Nor will it lead to mass unemployment. But the necessary adjustments will put strains on the societies of the rich countries, which seem completely unprepared for the coming industrial transformation.

Perhaps the most acute need, given the long lead-times, is to figure out how to educate children now for the jobs that will actually be available to them 10 and 20 years from now. Unfortunately, since the distinction between personal services (likely to remain in rich countries) and impersonal services (likely to go) does not correspond to the traditional distinction between high-skilled and low-skilled work, simply providing more education cannot be the whole answer.

As the transition unfolds, the number of people in the rich countries who will feel threatened by foreign job competition will grow enormously. It is predictable that they will become a potent political force in each of their countries. In the United States, job-market stress up to now has been particularly acute for the uneducated and the unskilled, who are less inclined to exercise their political voice and less adept at doing so. But the new cadres of displaced workers, especially those who are drawn from the upper educational reaches, will be neither as passive nor as quiet. They will also be numerous. Open trade may therefore be under great strain.

Large-scale offshoring of impersonal-service jobs from rich countries to poor countries may also bear on the relative economic positions of the United States and Europe. The more flexible, fluid American labor market will probably adapt more quickly and more successfully to dramatic workplace and educational changes than the more rigid European labor markets will.

Contrary to current thinking, Americans, and residents of other English-speaking countries, should be less concerned about the challenge from China, which comes largely in manufacturing, and more concerned about the challenge from India, which comes in services. India is learning to exploit its already strong comparative advantage in English, and that process will continue. The economists Jagdish Bhagwati, Arvind Panagariya, and T. N. Srinivasan meant to reassure Americans when they wrote, "Adding 300 million to the pool of skilled workers in India and China will take some decades." They were probably right. But decades is precisely the time frame that people should be thinking about -- and 300 million people is roughly twice the size of the U.S. work force.

Many other effects of the coming industrial transformation are difficult to predict, or even to imagine. Take one possibility: for decades, it has seemed that modern economic life is characterized by the ever more dehumanized workplace parodied by Charlie Chaplin in *Modern Times*. The shift to personal services could well reverse that trend for rich countries - bringing less alienation and greater overall job satisfaction. Alas, the future retains its mystery. But in any case, offshoring will likely prove to be much more than just business as usual.