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## Comeback: Why the Future of Industry is in America

# The Insourcing Boom

Excerpted from the Atlantic, December, 2012 -- BUSINESS

By Charles Fishman

**After years of offshore production, U.S. companies are moving much of their far-flung manufacturing operations back home. General Electric is an early example, but it is not alone. Whirlpool, from China to Ohio; Otis, from Mexico to South Carolina; even Wham-O, from China to California. Charles Fishman, award-winning investigative and magazine journalist, explores a startling, sustainable, just-getting-started return of industry to the United States. It has all the appearances of an insourcing boom.**

For much of the past decade, General Electric's storied Appliance Park, in Louisville, Kentucky, appeared less like a monument to American manufacturing prowess than a memorial to it. In 2011, Appliance Park employed not even a tenth of the 23,000 it did in its heyday.

GE's current CEO, Jeffrey Immelt, tried to sell the entire appliance business, including Appliance Park, in 2008, but as the economy nosed over, no one would take it. In 2011, the number of time-card employees—the people who make the appliances—bottomed out at 1,863.

However, something curious and hopeful had begun to happen, something that cannot be explained merely



Thomas Porostocky

by the ebbing of the Great Recession, and with it the cyclical return of recently laid-off workers. On February 10, 2012, Appliance Park opened an all-new assembly line in Building 2—largely dormant for 14 years—to make cutting-edge, low-energy water heaters. It was the first new assembly line at Appliance Park in 55 years—and the water heaters it began making had previously been made for GE in a Chinese contract factory.

On March 20, just 39 days later, Appliance Park opened a second new assembly line, this one in Building 5, to make new high-tech French-door refrigerators. The top-end model can sense the size of the container you place beneath its purified-water spigot, and shuts the spigot off automatically when the container is full. These refrigerators

are the latest versions of a style that for years has been made in Mexico.

Another assembly line is under construction in Building 3, to make a new stainless-steel dishwasher starting in early 2013. Building 1 is getting an assembly line to make the trendy front-loading washers and matching dryers; GE has never before made those in the United States.

In the midst of this revival, Immelt made a startling assertion. Writing in Harvard Business Review in March of 2012, he declared that outsourcing is “quickly becoming mostly outdated as a business model for GE Appliances.” Just four years after he tried to sell Appliance Park, believing it to be a relic of an era GE had transcended, he's spending some \$800 million to bring the place back to life. “I don't do that because I

run a charity,” he said at a public event in September. “I do that because I think we can do it here and make more money.” Immelt hasn’t just changed course; he’s pirouetted.

What has happened? Just five years ago, not to mention 10 or 20 years ago, the unchallenged logic of the global economy was that you couldn’t manufacture much besides a fast-food hamburger in the United States. Now the CEO of America’s leading industrial manufacturing company says it’s not Appliance Park that’s obsolete—it’s offshoring that is.

### The Accepted Life-Cycle Theory

In the 1960s, as the consumer-product world we now live in was booming, the Harvard economist Raymond Vernon laid out his theory of the life cycle of these products, a theory that predicted with remarkable foresight the global production of goods 20 years later. The U.S. would have an advantage making new, high-value products, Vernon wrote, because of its wealth and technological prowess; it made sense, at first, for engineers, assembly workers, and marketers to work in close proximity—to each other and to consumers—the better to get quick feedback, and to tweak product design and manufacture appropriately. As the market grew, and the product became standardized, production would spread to other rich nations, and competitors would arise. And then, eventually, as the product fully matured, its manufacture would shift from rich countries to low-wage countries. Amidst intensifying competition, cost would become the predominant concern, and because the making and marketing of the product were well understood, there would be little reason to produce it in the U.S. anymore.

Vernon’s theory has been borne out again and again over the years. Amana, for instance, introduced the first countertop microwave—the Radarange, made in Amana, Iowa—in 1967, priced at \$495. Today you can buy a microwave at Walmart for \$49 (the equivalent of a \$7 price tag on a 1967 microwave)—

and almost all the ones you’ll see there, a variety of brands and models, will have been shipped in from someplace where hourly wages have historically been measured in cents rather than dollars.

### Outsourcing, says Jeffrey Immelt, is quickly becoming an “outdated business model for GE Appliances.”

But beginning in the late 1990s, something happened that seemed to short-circuit that cycle. Low-wage Chinese workers had by then flooded the global marketplace. (Even as recently as 2000, a typical Chinese factory worker made 52 cents an hour. You could hire 20 or 30 workers overseas for what one cost in Appliance Park.) And advances in communications and information technology, along with continuing trade liberalization, convinced many companies that they could skip to the last part of Vernon’s cycle immediately: globalized production, it appeared, had become “seamless.” There was no reason design and marketing could not take place in one country while production, from the start, happened half a world away.

You can see this shift in America’s jobs data. Manufacturing jobs peaked in 1979 at 19.6 million. They drifted down slowly for the next 20 years—over that span, the impact of offshoring and the steady adoption of labor-saving technologies was nearly offset by rising demand and the continual introduction of new goods made in America. But since 2000, these jobs have fallen precipitously. The country lost factory jobs seven times faster between 2000 and 2010 than it did between 1980 and 2000.

Until very recently, this trend looked inexorable—and the significance of the much-vaunted increase in manufacturing jobs since the depths of the recession seemed easy to dismiss. Only 500,000 factory jobs were created between their low, in January 2010, and September 2012—a tiny fraction of the almost 6 million that were lost in the

aughts. And much of that increase, at first blush, might appear to be nothing more than the natural (but ultimately limited) return of some of the jobs lost in the recession itself.

Yet what’s happening at GE, and elsewhere in American manufacturing, tells a different and more optimistic story—one that suggests the curvature of Vernon’s product cycle may be changing once again, this time in a way that might benefit U.S. industry, and the U.S. economy, quite substantially in the years to come.

The GeoSpring water heater—the one that just came home to Louisville from China—looks a little like R2-D2, the Star Wars robot, although taller and slimmer. The magic is that it pulls ambient heat from the air to help heat water. As a result, the GeoSpring uses some 60 percent less electricity than a typical water heater. (You can also control it using your iPhone.) And for the first two and a half years that GE sold the GeoSpring, that’s exactly where it came from. Offshore production, from the start, appeared to provide substantial cost savings. But making it in China also meant risking that it might be knocked off. And so in 2009, even as they were rolling it out, the folks at Appliance Park were doing the math on bringing it home.

### Changes in the Global Economy

Even then, changes in the global economy were coming into focus that made this more than just an exercise—changes that have continued to this day.

- Oil prices are three times what they were in 2000, making cargo-ship fuel much more expensive now than it was then.
- The natural-gas boom in the U.S. has dramatically lowered the cost for running something as energy-intensive as a factory here at home. (Natural gas now costs four times as much in Asia as it does in the U.S.)
- In dollars, wages in China are some five times what they were in 2000—and they are expected to keep rising 18

percent a year.

■ American unions are changing their priorities. Appliance Park's union was so fractious in the '70s and '80s that the place was known as "Strike City." That same union agreed to a two-tier wage scale in 2005—and today, 70 percent of the jobs there are on the lower tier, which starts at just over \$13.50 an hour, almost \$8 less than what the starting wage used to be.

■ U.S. labor productivity has continued its long march upward, meaning that labor costs have become a smaller and smaller proportion of the total cost of finished goods. You simply can't save much money chasing wages anymore.

So much has changed that GE executives came to believe the GeoSpring could be made profitably at Appliance Park without increasing the price of the water heater. "First we said, 'Let's just bring it back here and build the exact same thing,'" says Kevin Nolan, the vice president of technology for GE Appliances.

To get ready to make the GeoSpring at Appliance Park, in January 2010 GE set up a space on the factory floor of Building 2 to design the new assembly line. The "big room" had design engineers assigned to it, but also manufacturing engineers, line workers, staff from marketing and sales—no management-labor friction, just a group of people with different perspectives, tackling a crucial problem.

"We got the water heater into the room, and the first thing [the group] said to us was 'This is just a mess,'" Nolan recalls. Not the product, but the design. "In terms of manufacturability, it was terrible."

It was so hard to assemble that no one in the big room wanted to make it. Instead they redesigned it. The team eliminated 1 out of every 5 parts. It cut the cost of the materials by 25 percent. It eliminated the tangle of tubing that couldn't be easily welded. By considering the workers who would have to put the water heater together—in fact, by having those workers right at the table,

looking at the design as it was drawn—the team cut the work hours necessary to assemble the water heater from 10 hours in China to two hours in Louisville.

The material cost went down. The labor required to make it went down. The quality went up. Even the energy efficiency went up. GE wasn't just able to hold the retail sticker to the "China price." It beat that price by nearly 20 percent. The China-made GeoSpring retailed for \$1,599. The Louisville-made GeoSpring retails for \$1,299.

Time-to-market has also improved, greatly. Today, the water heaters—and the dishwashers and refrigerators—move straight from the manufacturing buildings to Appliance Park's warehouse out back, from which they can be delivered to Lowe's and Home Depot. Total time from factory to warehouse: 30 minutes.

### The Downsides of Distance

What is only now dawning on the smart American companies, says Lenzi, is that when you outsource the making of the products, "your whole business goes with the outsourcing." Which raises a troubling but also thrilling prospect: the offshoring rush of the past decade or more—one of the signature economic events of our times—may have been a mistake.

Business practices are prone to fads, and in hindsight, the rush to offshore production 10 or 15 years ago looks a little extreme. The distance across the Pacific Ocean was as wide then as it is now, and the speed of cargo ships was just as slow. A lot of the very good reasons for bringing factories back to the U.S. today were potent arguments against offshoring in the first place.

It was important to innovate, and to protect innovations, 10 or 15 years ago. It was important to have designers, engineers, and assembly-line workers talk to each other then, too. That companies spent the past two decades ignoring those things just shows the power of price, even for people who should be able to take a broader view.

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**"There was a herd mentality to offshoring. And some bullshit. Many big costs were hidden."**

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Harry Moser, an MIT-trained engineer, spent decades running a business that made machine tools. After retiring, he started an organization called the Reshoring Initiative in 2010, to help companies assess where to make their products. "The way we see it," says Moser, "about 60 percent of the companies that offshored manufacturing didn't really do the math. They looked only at the labor rate—they didn't look at the hidden costs." Moser believes that about a quarter of what's made outside the U.S. could be more profitably made at home.

"There was a herd mentality to the offshoring," says John Shook, a manufacturing expert and the CEO of the Lean Enterprise Insti-tute, in Cambridge, MA. "And there was some bullshit. But it was also the inability to see the total costs—the engineers in the U.S. and factory managers in China who can't talk to each other; the management hours and money flying to Asia to find out why the quality they wanted wasn't being delivered. The cost of all that is huge."

Thomas Mayor, a senior adviser with Booz & Company who specializes in manufacturing strategy, says that in industry after industry, he is seeing the same kind of reassessment GE has made. When asked about the value of the original rush offshore, Mayor laughs.

"Twelve years ago, I saw a lot of boards of directors and senior executives saying, 'Three years from now, I'm going to be sourcing \$4 billion in product from China. Go figure out how to make it happen.'" Part of the rationale, from the start, was merely to gain a foothold in the Chinese market. And for many companies, that made sense, at least to some extent. "But if you press them on their savings by sourcing from China for North America, I get stories like 'Oh, I asked about that six months



ago. I had five finance guys working on it, and they couldn't come up with any savings.' At the end of the day, they say, 'If we were doing this for the U.S. market, we should never have gone to China in the first place.'"

GE is not alone in moving the manufacture of many of its products back to the U.S. ISI Group, an investment research company, put out a 98-page report in August, piling up reasons for the return of a strong U.S. industrial sector. Nancy Lazar, who co-authored the ISI Group report, says, "This is the beginning of a manufacturing renaissance. Even the industrial companies told me I was crazy. Why? Because they've spent the last 15 or 20 years putting the plants outside the U.S. That's over."

The recalibration of costs in recent years is one reason, and the competitive benefit of keeping production stateside is another. But the logic of onshoring today goes even further—and is driven, in part, by the newfound impatience of the product cycle itself.

The feverish cycle of innovation and new products beloved in the electronics world has infected all kinds of consumer categories. Products that once seemed mature—from stoves to greeting cards—are being reinvigorated with cheap computing technology. And the product life cycle is speeding up—many goods get outflanked by "smarter" versions every couple of years, or faster.

Factories take a while to settle into a new product, a new design. They face a learning curve. But models that have a run of only a couple years become outdated just as the assembly line starts to hum. That, too, makes using faraway factories challenging, even if they are cheap.

The addition of high-tech components to everyday items makes production more complicated, and that means U.S. production is more attractive, not just because manufacturers now have more proprietary technology to protect, but because American workers are more skilled, on average, than their Chinese counterparts. And the short

leap from one product generation to the next makes the alchemy among engineers, marketers, and factory workers all the more important.

### A New Labor Environment

One key difference between the U.S. economy today and that of 15 or 20 years ago is the labor environment—not just wages in factories, but the degree of flexibility displayed by unions and workers. Many observers would say these changes reflect a loss of power and leverage by workers, and they would be right.

But management, more keenly aware of offshoring's perils, is also trying to create a different (and better) factory environment. Hourly employees increasingly participate in workplace decision making in ways that are more like what you find in white-collar technology companies. The results can be dramatic.

At the public event in September, 2012 Immelt captured the lessons of the new Appliance Park. "I think the era of inexpensive labor is basically over," he said. "People that are out there just chasing what they view as today's low-cost labor—that's yesterday's play-book."

GE is rediscovering that how you run the factory is a technology in and of itself. Your factory is really a laboratory—and the R&D that can happen there, if you pay attention, is worth a lot more to the bottom line than the cost savings of cheap labor in someone else's factory.

Outsourcing and the disappearance of U.S. factory jobs were the result of what often seemed like irresistible market forces—but they were also the result of individual decisions, factory by factory, spreadsheet by spreadsheet, company by company.

### Some Things will Never Return

What's happening in factories across the U.S. is not simply a reversal of decades of outsourcing. If there was once a rush to push factories of nearly every kind offshore, their return is more careful; Of course, many things are never coming back. Levi Strauss

used to have more than 60 domestic blue-jeans plants; today it contracts out work to 16 and owns none, and it's hard to imagine mass-market clothing factories ever coming back in significant numbers—the work is too basic.

Manufacturing employment will never again be as central to the U.S. economy as it was in the 1960s and '70s—improvements in worker productivity alone ensure that. Back in the '60s, Appliance Park was turning out 250,000 appliances a month. The assembly lines there today are turning out almost as many—with at most one-third of the workers.

It's possible that five years from now, everything will have unraveled—that the return of factory jobs will have been a temporary blip, that Appliance Park will be closed. (Business practices, after all, are prone to fads.)

But that doesn't seem likely.

In fact, insourcing solves a whole bundle of problems—it simplifies transportation; it gives people confidence in the competitive security of their ideas; it lets companies manage costs with real transparency and close to home; it means a company can be as nimble as it wants to be, because the Pacific Ocean isn't standing in the way of getting the right product to the right customer.

Many offshoring decisions were based on a single preoccupation—cheap labor. The labor was so cheap, in fact, that it covered a multitude of sins in other areas. The approach to bringing jobs back has been much more thoughtful. Jobs are coming back not for a single, simple reason, but for many intertwined reasons—which means they won't slip away again when one element of the business, or the economy, changes. □

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