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## The New Logic of Offshoring

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Butler International's Ed Kopko and roundtable participants outline the next wave of engineering development.

In its earliest phase, offshoring was driven by cost reduction and limited to non-mission-critical work such as call centers, credit card processing and administrative work. Companies raced to source work in Asia-Pacific, South American and Eastern European countries where workers are plentiful and wages are low. Over time, the level of work being performed abroad began to move up the value chain, encompassing more technical work, including finance and accounting.

The next wave—where companies move work even more essential to competitive success, such as innovation and engineering, overseas—is now upon us. Already, IBM has established an R&D lab

in New Delhi and announced intentions to recruit some 14,000 additional “software inventors,” according to a recent report by Duke University and Booz Allen Hamilton. Motorola currently operates 16 R&D centers in China, which collectively employ 1,800 engineers, a tenth of the company’s total global R&D head count.

These are not anomalies. According to a recent survey by the Economist Intelligence Unit, a research firm headquartered in London, a growing number of companies are outsourcing and/or offshoring aspects of the innovation process. Some 65 percent of companies surveyed said that at least some of their R&D activity is taking place overseas; 64 percent reported currently outsourcing part of the innovation process to outside organizations.

Done well, leveraging the less costly talent pools of foreign shores can clearly offer a huge competitive advantage, noted CEO participants in a roundtable discussion cosponsored by Butler International. In countries like India, China, Mexico and Russia, technical know-how is available at a fraction of what it would cost in the U.S. Companies able to tap this pool effectively can create and roll out prototypes at a fraction of the cost it would take competitors sourcing innovation in the U.S. or Europe.

### Strategic Sourcing

At first blush, moving core processes like innovation to foreign shores seems like a huge leap. But it’s actually a natural next phase of the offshoring movement, pointed out Joe McGrath, CEO of Unisys. “The global arbitrage of labor, the talent available around the world, and the number of engineers graduating in [developing economies] have led us to move functions you wouldn’t have expected offshore,” he said. “Because of Sarbanes-Oxley, for example, it’s hard to get internal auditors in the U.S. So we’ve sourced all our recent hires in Shanghai. Who would have thought that your core auditing practice would be in Shanghai, Budapest or Hungary? But that’s where it is.”

Companies are no longer just moving things that are easy to do offshore,” agreed Gary Gereffi, a professor in the Department of Sociology and Markets & Management Studies Program at Duke University. “Microsoft’s Beijing R&D Center is doing things with character recognition software that they think are as advanced as anything going on with that issue anywhere in the world. And GE’s [research] of environmental issues in China is also unique. As capabilities grow, companies are trying to find places around the world that can tackle global problems in the best possible way.”

A confluence of factors is driving this trend. In a world where great ideas are quickly assimilated across global markets, continual innovation is crucial to competitive success. At the same time, the development of ever-more-sophisticated technology is driving an increase in both the cost and complexity of R&D activity for most companies.



L. to r.: CitTran's CEO Jehab J. Hawatmeh, FM Global's CEO Shivan Subramaniam, Unisys's CEO Joseph McGrath

“Outsourcing is something of a misnomer,” noted Ron DeFeo, chairman and CEO of Terex, who says the word often has undeserved negative connotations among the general public. “The term tends to politicize the practice, when in reality we are not giving something up, we’re looking for the best answer,” he adds. “If that best answer sits next door to me and is affordable, I would be foolish not to go there. If it sits halfway across the globe and is difficult to achieve but is my best solution, I’d be stupid not to go after that.”

And even companies with the deepest of pockets find themselves grappling with shortages of specialist talent in their local marketplaces. A recent study by Duke University suggests that the long-lamented decline in the number of Americans graduating with engineering degrees is not as significant as early statistics suggested (see chart p. 40). But U.S. CEOs still report facing a shortage of workers capable of developing next-generation technologies and managing R&D teams.

Why the dearth of qualified candidates? “One issue is that we have a hard time getting the best and brightest U.S. undergraduates to go into engineering and science,” said Gereffi. “They have lots of other attractive options.”

“When parents look at what they want to encourage their children to do, they almost always consider where the money is,” agreed Leif O’Leary, senior vice president of Parametric Technology. “The most lucrative opportunities in America are almost always investment banking, financial services and consulting.”

In the past, the domestic talent pool was augmented by foreign-born U.S. undergraduates who opted to stay in the country after graduation. In fact, more than 60 percent of engineering Ph.D.s awarded in the 2005-

2006 academic year in the U.S. were earned by foreign nationals, according to Engineering Trends, a Houghton, Mich.-based educational consulting firm. But with overseas markets booming, many more of these students choose to return and pursue a career in their home countries. And those who do wish to stay often find that they cannot get around the more stringent requirements of post-9/11 immigration regulations.

"We are educating the world," said Jack Manning, vice president of engineering and offshore services at Butler International. "But the U.S. government cap on H1B visas is denying access to some of the best and the brightest graduates—and in turn, putting a stranglehold on U.S. competitiveness. Policies that restrict smart people from all over from coming here and being able to work are actually helping to spur the rush offshore."

### **Outside Innovation**

Even as the trend toward offshoring and outsourcing innovation gains momentum, CEOs are well aware that the practice comes with a host of challenges and concerns, chief among them issues of control, intellectual property theft, internal resistance, cultural differences and communications.

"Engineering is such a primal part of companies that they need to have control," said Manning, who noted that when it comes to offshoring arrangements it's far better to wish you were married than to wish you weren't. "It's not like IT, which is often a support function. Engineering is the family jewels, so you have to be very careful about how you tie up."

Manning, who has worked with hundreds of companies on offshoring initiatives, outlined three prerequisites for successful global sourcing: a compelling business reason, good domain matching and the right culture and leadership within the company. "You can't expect a middle manager to move a mountain," he asserted, likening the process to that of integrating an acquisition. "You need to have top-down leadership and a culture that will make it happen."

"A clear business imperative is one of the most critical pieces of the puzzle, added Ed Kopko, CEO of Butler International, who noted that often even components of the most mission-critical innovation process can be done more effectively through outsourcing. "Most companies, for example, have cycles where they spend a lot of money on innovation to get the product to market," he said, pointing to the aviation industry as an example. "When you design a new aircraft, you spend a huge amount of money during a short period of time. It doesn't make sense to have all the people and functions involved internal to your company because after the three- to five-year cycle you'll be left with tons of cost."

"Something can be mission-critical and not strategic," agreed McGrath. "There may be no way to differentiate in that particular area of expertise, so you make a choice to outsource that."

Ideally, shifting key areas of R&D offshore enables a company to augment its innovative capabilities while simultaneously cutting costs. But in practice, it doesn't always work that way. Joint ventures fizzle, costs spiral out of control or intellectual property finds its way to the homegrown factory down the street. Where do some companies go wrong?

"Most people are tactical as opposed to strategic," answered McGrath, who notes that all too often it's the sight of competitors nipping at a company's heels that prompts a move toward offshoring. "They feel forced to act because they're disadvantaged from a cost perspective, so they become reactionary as opposed to developing a strategy."

## Where Are the Engineers?

In the annals of offshoring, much is made of statistics that suggest that far more engineering graduates are being produced by India and China than the U.S. But a recent study by Duke University argues that it simply isn't so.

In 2005, Duke looked at assertions that India and China were graduating 12 times as many engineers as the U.S. and found that while the definition of "engineer" differs considerably from country to country, the number of engineers—as defined by U.S. standards—does not.

"In China... a motor mechanic or technician could be considered an engineer, for example," explained authors of the report in an article for *Issues In Science and Technology* magazine. "Also, the numbers included all degrees related to information technology and to specialized fields such as shipbuilding. It seems that any bachelor's degree with "engineering" in its title was included in the ministry's statistics, regardless of the degree's field or associated academic rigor."

Still, U.S. companies increasingly pursue outsourcing of engineering-related activities—which suggests that they do so to cut costs rather than in response to a shortage of domestic talent and a surplus of such talent in India and China, stated the report.

In a follow-up study titled "Industry Trends in Engineering Offshoring," Duke looked more deeply at the trends in engineering outsourcing by surveying companies considered to be actively offshoring about their experiences. The findings suggest that U.S. engineers offer advantages over their offshore peers in quality and productivity, as well as soft skills.

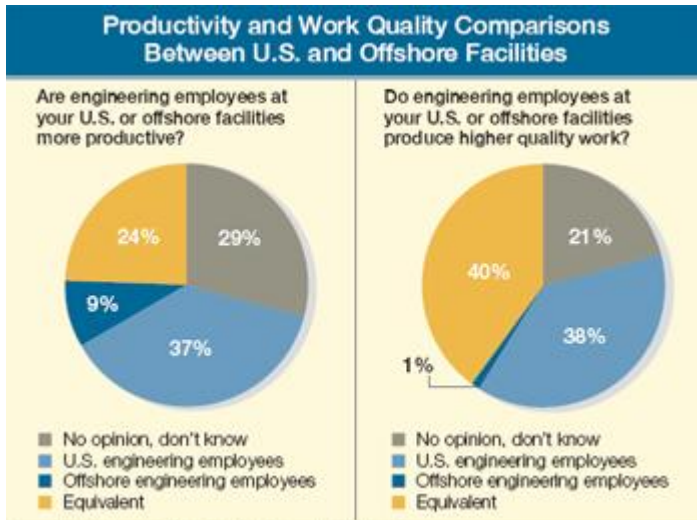
"The productivity of American engineers is almost always higher or equal to those hired offshore," wrote Gary Gereffi, Ben Rissing, and Vivek Wadhwa, coauthors of the report. "Engineering jobs in the U.S. are more technical or equal. The quality of work done by U.S. workers is generally higher than or equal to what is done overseas. Business executives highlight the superior business skills of American workers and their creativity and ability to challenge the status quo."

Yet, just 5 percent of respondents envisioned stabilizing or contracting their offshore operations. "Companies see many challenges in offshoring work," concluded the report, "yet gain enough benefit for the trend to continue, and most expect their overseas operations to expand." ▲

### The People Picture

Choosing the right approach is also critical. Companies face a difficult choice—to create their own offshore operation or to work with a specialized provider. The dilemma has even bred an interim measure—the build, operate and transfer model, where the offshoring company has the option to buy the independent facility after a specified number of years.

Finding the right people within the organization to manage the process and giving them both the tools and the incentives they need to drive the effort is also key, noted Ihab Hawatmeh, CEO of CirTran. "It's really about picking the people who you feel are open-minded and who have great interpersonal skills," he said. "Those are the ones who can adapt to the environment, gain respect and smooth out the operation."



Overcoming internal resistance to outsourcing and offshoring can add to the challenge. While support from the top about the strategic imperative and the right incentives can go a long way toward building consensus around an initiative, many companies find that having a defined process and methodology eases the transition for employees.

"We blueprint a process so that it can be replicated in other regions and business units," McGrath explained. "We're passionate about that because it's the only way to eliminate variation in execution. You've got to bring everyone in line with this common process."

Finally, disseminating that process across the value chain is paramount. Without open lines of communication between and among engineers, collaboration will sputter and die. "If you don't have a pathway to share information, then it's the old story of 'Was there a noise in the forest when the tree fell or not?'" said DeFeo. "Communication is key. A lot of it comes down to a leadership structure that allows knowledge to flow readily and openly between your organizations."



Butler International's Jack Manning stresses knowledge transfer.

“Knowledge transfer is probably the No. 1 issue,” agreed Manning. “Because no matter how good your sources are, they have to learn the way you want to do it. That’s why the most successful engagements have people managing the project who are really good at offshoring and at cultural adaptation, and who really know the organization.”

“Success has more to do with who you put on the leadership teams than virtually anything else,” continued Manning. “You need people who have the ability to think big and think flat.”

# WHO'S WHO

▶ **Ron DeFeo** is chairman and CEO of Terex, a Westport, Conn.-based manufacturer of construction equipment.

▶ **J.P. Donlon** is editor-in-chief of Montvale, N.J.-based *Chief Executive* magazine.

▶ **Gary Gereffi** is a professor in the Department of Sociology and Markets & Management Studies Program at Durham, N.C.-based Duke University.

▶ **Ilehab J. Hawatmeh** is president, chairman and CEO of West Valley City, Utah-based CirTran, a service contract manufacturing company.



▶ **Ed Kopko** is chairman and CEO of Montvale, N.J.-based Butler International, a provider of technical, engineering and technology services.

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▶ **Leif O'Leary** is senior vice president of Parametric Technology, a Needham, Mass.-based manufacturer of mechanical computer design, manufacturing and engineering software.

▶ **Shivan Subramaniam** is chairman and CEO of Norwood, Mass.-based FM Global, a commercial and industrial property insurer.