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How GE Is Disrupting Itself

by Jeffrey R. Immelt, Vijay Govindarajan, and Chris Trimble

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The Idea in Brief

- The model that GE and other industrial manufacturers have followed for decades—developing high-end products at home and adapting them for other markets around the world—won't suffice as growth slows in rich nations.
- To tap opportunities in emerging markets and pioneer value segments in wealthy countries, companies must learn reverse innovation: developing products in countries like China and India and then distributing them globally.
- While multinationals need both approaches, there are deep conflicts between the two. But those conflicts can be overcome.
- If GE doesn't master reverse innovation, the emerging giants could destroy the company.

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In May 2009, General Electric announced that over the next six years it would spend $3 billion to create at least 100 health-care innovations that would substantially lower costs, increase access, and improve quality. Two products it highlighted at the time—a $1,000 handheld electrocardiogram device and a portable, PC-based ultrasound machine that sells for as little as $15,000—are revolutionary, and not just because of their small size and low price. They're also extraordinary because they originally were developed for markets in emerging economies (the ECG device for rural India and the ultrasound machine for rural China) and are now being sold in the United States, where they're pioneering new uses for such machines.

We call the process used to develop the two machines and take them global *reverse innovation*, because it's the opposite of the *glocalization* approach that many industrial-goods manufacturers based in rich countries have employed for decades. With glocalization, companies develop great products at home and then distribute them worldwide, with some adaptations to local conditions. It allows multinationals to make the optimal trade-off between the global scale so crucial to minimizing costs and the local customization required to maximize market share. Glocalization worked fine in an era when rich countries accounted for the vast majority of the market and other countries didn't offer much opportunity. But those days are over—thanks to the rapid development of populous countries like China and India and the slowing growth of wealthy nations.

GE badly needs innovations like the low-cost ECG and ultrasound machines, not only to expand beyond high-end segments in places like China and India but also to preempt local companies in those countries—the emerging giants—from creating similar products and then using them to disrupt GE in rich countries. To put it bluntly: If GE's businesses are to survive and prosper in the next decade, they must become as adept at reverse innovation as they are at glocalization. Success in

developing countries is a prerequisite for continued vitality in developed ones.

The problem is that there are deep conflicts between glocalization and reverse innovation. And the company can't simply replace the first with the second, because glocalization will continue to dominate strategy for the foreseeable future. The two models need to do more than coexist; they need to cooperate. This is a heck of a lot easier said than done since the centralized, product-focused structures and practices that have made multinationals so successful at glocalization actually get in the way of reverse innovation, which requires a decentralized, local-market focus.

Almost all the people and resources dedicated to reverse innovation efforts must be based and managed in the local market. These local growth teams need to have P&L responsibility; the power to decide which products to develop for their markets and how to make, sell, and service them; and the right to draw from the company's global resources. Once products have proven themselves in emerging markets, they must be taken global, which may involve pioneering radically new applications, establishing lower price points, and even using the innovations to cannibalize higher-margin products in rich countries. All of those approaches are antithetical to the glocalization model. This article aims to share what GE has learned in trying to overcome that conflict.

Why Reverse Innovation Is So Important

Glocalization is so dominant today because it has delivered. Largely because of glocalization, GE's revenues outside the United States soared from $4.8 billion, or 19% of total revenues, in 1980, to $97 billion, or more than half of the total, in 2008.

The model came to prominence when opportunities in today's emerging markets were pretty limited—when their economies had yet to take off and their middle or low-end customer segments didn't exist. Therefore, it made sense for multinational manufacturers to simply offer them modifications of products for developed countries. Initially, GE, like other multinationals, was satisfied with the 15% to 20% growth rates its businesses enjoyed in developing countries, thanks to glocalization.

Then in September 2001 one of the coauthors of this piece, Jeff Immelt, who had just become GE's CEO, set a goal: to greatly accelerate organic growth at the company and become less dependent on acquisitions. This made people question many things that had been taken for granted, including the glocalization strategy, which limited the company to skimming the top of emerging markets. A rigorous analysis of GE's health-care, power-generation, and power-distribution businesses showed that if they took full advantage of opportunities that glocalization had ignored in heavily populated places like China and India, they could grow two to three times faster there. But to do that, they'd have to develop innovative new products that met the specific needs and budgets of customers in those markets. That realization, in turn, led GE executives to question two core tenets of glocalization:

Assumption 1: Emerging economies will largely evolve in the same way that wealthy economies did. The reality is, developing countries aren't following the same path and could actually jump ahead of developed countries because of their greater willingness to adopt breakthrough innovations. With far smaller per capita incomes, developing countries are more than happy with high-tech solutions that deliver decent performance at an ultralow cost—a 50% solution at a 15% price. And they lack many of the legacy infrastructures of the developed world, which were built when conditions were very different. They need communications, energy, and transportation products that address today's challenges and opportunities, such as unpredictable oil prices and ubiquitous wireless technologies. Finally, because of their huge populations, sustainability problems are especially urgent for countries like China and India. Because of this, they're likely to tackle many environmental issues years or even decades before the developed world.

All this isn't theory. It's already happening. Emerging markets are becoming centers of innovation in fields like low-cost health-care devices, carbon sequestration, solar and wind power, biofuels, distributed power generation, batteries, water desalination, microfinance, electric cars, and even ultra-low-cost homes.

Assumption 2: Products that address developing countries' special needs can't be

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sold in developed countries because they're not good enough to compete there. The reality here is, these products can create brand-new markets in the developed world—by establishing dramatically lower price points or pioneering new applications.

Consider GE's health-care business in the United States. It used to make most of its money on premium computed tomography (CT) and magnetic resonance (MR) imaging machines. But to succeed in the era of broader access and reduced reimbursement that President Obama hopes to bring about, the business will probably need to increase by 50% the number of products it offers at lower price points. And that doesn't mean just cheaper versions of high-tech products like imaging machines. The company also must create more offerings like the heated bassinet it developed for India, which has great potential in U.S. inner cities, where infant deaths related to the cold remain high.

And let's not forget that technology often can be improved until it satisfies more demanding customers. The compact ultrasound, which can now handle imaging applications that previously required a conventional machine, is one example. (See "Reverse Innovation in Practice.") Another is an aircraft engine that GE acquired when it bought a Czech aerospace company for $20 million. GE invested an additional $25 million to further develop the engine's technology and now plans to use it to challenge Pratt & Whitney's dominance of the small turboprop market in developed countries. GE's cost position is probably half of what Pratt's is.

Preempting the Emerging Giants

Before the financial crisis plunged the world into a deep recession, GE's leaders had been looking to emerging markets to help achieve their ambitious growth objectives. Now they're counting on these markets even more because they think that after the downturn ends, the developed world will suffer a prolonged period of slow growth—1% to 3% a year. In contrast, annual growth in emerging markets could easily reach two to three times that rate.

Ten years ago when GE senior managers discussed the global marketplace, they talked about "the U.S., Europe, Japan, and the rest of the world." Now they talk about "resource-rich regions," such as the Middle East, Brazil, Canada, Australia, and Russia, and "people-rich regions," such as China and India. The "rest of world" means the U.S., Europe, and Japan.

To be honest, the company also is embracing reverse innovation for defensive reasons. If GE doesn't come up with innovations in poor countries and take them global, new competitors from the developing world—like Mindray, Suzlon, Goldwind, and Haier—will.

In GE's markets the Chinese will be bigger players than the Indians will. The Chinese have a real plan to become a major global force in transportation and power generation. GE Power Generation is already regularly running into Chinese enterprises as it competes in Africa, which will be an extremely important region for the company. One day those enterprises may compete with GE in its own backyard.

That's a bracing prospect. GE has tremendous respect for traditional rivals like Siemens, Philips, and Rolls-Royce. But it knows how to compete with them; they will never destroy GE. By introducing products that create a new price-performance paradigm, however, the emerging giants very well could. Reverse innovation isn't optional; it's oxygen.

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A Clash of Two Models

Glocalization has defined international strategy for three decades. All the currently dominant ideas—from Christopher A. Bartlett and Sumantra Ghoshal's "transnational" strategy to Pankaj Ghemawat's "adaptation-aggregation" trade-off—fit within the glocalization framework. Since organization follows strategy, it's hardly surprising that glocalization also has molded the way that multinationals are structured and run.

GE is a case in point. For the past 30 years, its organization has evolved to maximize its effectiveness at glocalization. Power and P&L responsibility were concentrated in global business units headquartered in the developed world. The major business functions—including R&D, manufacturing, and marketing—were centralized at headquarters. While some R&D centers and manufacturing operations were moved abroad to tap overseas talent and reduce costs, they focused mainly on products for wealthy countries.

While this approach has enormous advantages, it makes reverse innovation impossible.

The experiences of Venkatraman Raja, the head of GE Healthcare's business in India, illustrate why.

GE Healthcare sells an x-ray imaging product called a surgical C-arm, which is used in basic surgeries. A high-quality, high-priced product designed for hospitals in wealthy countries, it has proven tough to sell in India. Raja saw the problem and made a proposal in 2005. He wanted to develop, manufacture, and sell a simpler, easier-to-use, and substantially cheaper product in India. His proposal made sense, and yet, to no one's surprise, it was not approved.

If you were a leader of a GE operation in a developing country, as Raja was, here's what you were up against: Your formal responsibilities included neither general management nor product development. Your responsibility was to sell, distribute, and service GE's global products locally and provide insights into customers' needs to help the company adapt its offerings. You were expected to grow revenues by 15% to 20% a year and make sure that costs increased at a much slower rate, so that margins rose. You were held rigidly accountable for delivering on plan. Just finding the time for an extracurricular activity like creating a proposal for a product tailored to the local market was challenging.

That was nothing, however, compared with the challenge of the next step: selling your proposal internally. Doing so required getting the attention of the general manager at headquarters in the United States, who sat two or more levels above your immediate boss and was far more familiar with a world-renowned medical center in Boston than a rural clinic outside Bangalore. Even if you got the meeting, you'd have limited time to make your case. (India accounted for just 1% of GE's revenues at the time and occupied roughly the same mindshare of managers with global responsibility.)

Reverse Innovation in Practice

1 ORIGINAL PRODUCT

In the 1990s GE served the Chinese ultrasound market with machines developed in the U.S. and Japan.

CONVENTIONAL ULTRASOUND
2002 PRICE

$100K AND UP

TYPICAL CUSTOMERS
Sophisticated hospital imaging centers

TYPICAL USES
- Cardiology (such as measuring the size of passages or blood flow in the heart)
- Obstetrics (monitoring fetal health)
- General radiology (assessing prostate health, for example)

But the expensive, bulky devices sold poorly in China.

2 THE EMERGING MARKET DISRUPTION

In 2002 a local team in China leveraged GE's global resources to develop a cheap, portable machine using a laptop computer enhanced with a probe and sophisticated software.

If you were extremely persuasive, you might be invited to share the proposal with others. But when you visited the head of global manufacturing, you'd have to counter arguments that a simple, streamlined global product line was much more efficient than custom offerings. When you visited the head of marketing, you'd have to deal with fears that a lower-priced product would weaken the GE brand and cannibalize existing sales. When you met with the head of finance, you'd have to wrestle with concerns that lower-priced products would drag down overall margins. And when you visited the head of global R&D, you'd have to explain why the energies of GE's scientists and engineers—including those in technology centers in emerging markets—should be diverted from projects directed at its most sophisticated customers, who paid top dollar.

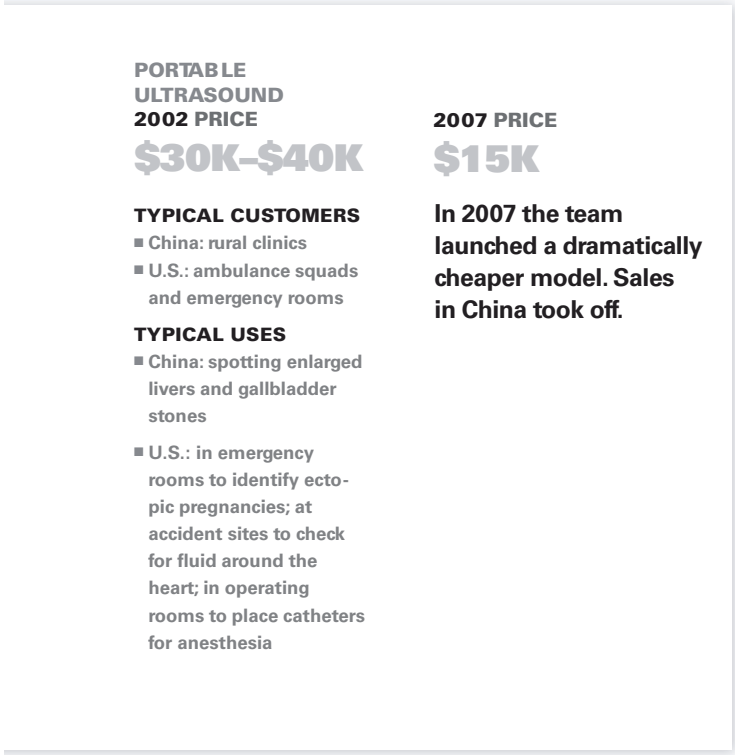
Even if you gained support from each of these executives and got the proposal off the ground, you'd still have to compete for capital year after year against more certain projects with shorter-term payoffs. Meanwhile, of course, you'd still have to worry about making your quarterly numbers for your day job.

It was little wonder that successful efforts to develop radically new products for poor countries were extremely rare.

Shifting the Center of Gravity

Obviously, changing long-established structures, practices, and attitudes is an enormous task. As is the case in any major change program, the company's top leaders have to play a major role.

To do so, they must investigate firsthand the size of the opportunity and how it could be exploited and encourage the teams running the corporation's businesses to do the same. As GE's CEO, Jeff goes to China and India two times a year. When he's in, say, China, he'll spend a day at GE's research



center in Shanghai and then meet separately with dozens of people in the company's local business operations and just let them talk about what they're working on, what their cost points are, who their competitors are, and so on. On such visits, he has realized that there's a whole realm of technology that the company should be applying faster.

While in China, Jeff will also talk with government leaders, including Premier Wen Jiabao. Wen has told Jeff about his plans to develop China's economy and how making health care affordable for all citizens fits into that. It takes a conversation like that to fully appreciate the opportunities in China.

In India, Jeff will have dinner with the CEOs of Indian companies. At one dinner Anand Mahindra talked about how his company, Mahindra & Mahindra, was making life miserable for John Deere in India with a tractor that cost half the price of Deere's but was still enormously profitable. Such discussions drive home the point that you can make a lot of money in India if you have the right business models.

More than 90% of China's population still relies on poorly funded, low-tech hospitals or basic clinics in rural villages.

So the job of the CEO—of any senior business leader, for that matter—is to connect all the dots and then act as a catalyst. It's to give initiatives special status and funding and personally monitor them on a monthly or quarterly basis. And perhaps most important in the case of reverse innovation, it's to push your enterprise to come up with the new organizational form that will allow product and business-model innovation to flourish in emerging markets.

A Homegrown Model

To develop that new organizational form, GE did what it has always done: learn from other companies' experiences but also try to find an internal group that somehow had managed to overcome the hurdles and achieve success. During their annual strategy review, the company's leaders spotted one in the ultrasound unit of GE Healthcare.

GE Healthcare's primary business is high-end medical-imaging equipment. By the late 1980s it had become clear that a new technology—ultrasound—had a bright future. Ultrasound machines, like the other imaging devices, were typically found in sophisticated imaging centers in hospitals. While they delivered lower quality than CT or MR scanners, they did so at much lower cost. The company aimed to be number one in ultrasound.

Over the next decade, GE Healthcare expanded its presence in the market. It built an R&D facility for developing new ultrasound products near its headquarters, in Milwaukee, and made acquisitions and entered into joint ventures around the world. It competed in all three of the primary market segments—obstetrics, cardiology, and general radiology—by launching premium products that employed cutting-edge technologies. By 2000, GE Healthcare had established solid market positions in rich countries around the world.

The results in developing countries, by contrast, were disappointing. By 2000, with the help of a joint venture partner in China, GE saw the problem: In wealthy countries performance mattered most, followed by features; in China price mattered most, followed by portability and ease of use.

The priorities weren't the same because the health-care infrastructure of China was so different from that of rich countries. More than 90% of China's population relied (and still relies) on poorly funded, low-tech hospitals or basic clinics in rural villages. These facilities had no sophisticated imaging centers, and transportation to urban hospitals was difficult, especially for the sick. Patients couldn't come to the ultrasound machines; the ultrasound machines, therefore, had to go to the patients.

There was no way that GE could meet that need by simply scaling down, removing features from, or otherwise adapting its existing ultrasound machines, which were large, bulky, expensive, and complex. It needed a revolutionary product.

In 2002, the company launched its first compact ultrasound, which combined a regular laptop computer with sophisticated software. It sold for as low as $30,000. In late 2007, GE introduced a model that sold for as low as $15,000, less than 15% of the cost of GE's high-end ultrasound machines. Of course, its performance was not as high, but it was nonetheless a hit in rural clinics, where doctors used it for simple applications, such as spotting enlarged livers and gallbladders and stomach irregularities. The software-centric design also made it easy to adjust the machine—for example, to improve the interfaces—after observing how doctors

worked with it. Today the portable machine is the growth engine of GE's ultrasound business in China.

Even more exciting, the innovation has generated dramatic growth in the developed world by pioneering new applications where portability is critical or space is constrained, such as at accident sites, where the compacts are used to diagnose problems like pericardial effusions (fluid around the heart); in emergency rooms, where they are employed to identify conditions such as ectopic pregnancies; and in operating rooms, where they aid anesthesiologists in placing needles and catheters.

Six years after their launch, portable ultrasounds were a $278 million global product line for GE, one that was growing at 50% to 60% a year before the worldwide recession hit. Someday every general practitioner may carry both a stethoscope and a compact ultrasound device embedded in his or her PDA.

The products owe their successful development to an organizational anomaly in GE: the existence of multiple ultrasound business units. Although the three primary segments of the ultrasound business are vastly different, GE's initial instinct was to follow the glocalization model when it built the business—that is, to create a single integrated global organization. In 1995, however, Omar Ishrak, a newcomer who had been hired to lead the business, saw that meshing operations would reduce them to a common denominator that served nobody well. He decided to run the business as three independent business units with their own P&L responsibility, all reporting to him.

When the compact ultrasound effort began in China, Ishrak saw that the new business would have little in common with the three units, which were focused on premium products. So instead, he created a fourth independent unit, based in Wuxi, China. It evolved the local growth team (LGT) model, which is based on five critical principles.

1. Shift power to where the growth is. Without autonomy, the LGTs will become pawns of the global business and won't be able to focus on the problems of customers in emerging markets. Specifically, they need the power to develop their own strategies, organizations, and products. Ishrak understood this and gave such broad authority to Diana Tang and J.K. Koo, the leaders of GE's ultrasound effort in China. The pair of GE veterans had deep experience in the ultrasound business, expertise in biomedical engineering and general management, and lengthy careers in Asia.

2. Build new offerings from the ground up. Given the tremendous gulfs between rich countries and poor ones in income, infrastructure, and sustainability needs, reverse innovation must be zero-based. These wide differences cannot be spanned by adapting global products.

The compact ultrasound was built from scratch, although it drew heavily from an existing R&D effort. In the late 1990s, in a product-development center in Israel, GE had started to experiment with a revolutionary new architecture—one that shifted most of the muscle inside an ultrasound machine from the hardware to the software. Instead of a large box full of custom hardware, the scientists and engineers involved in the project envisioned a standard high-performance PC, special peripherals such as an ultrasound probe, and sophisticated software.

The concept generated little excitement in GE Healthcare at the time because it could not come close to matching the performance of the business's premium products. But Ishrak quickly saw the value of the new architecture in developing countries. He encouraged the team in China to pursue the concept further. The resulting compact ultrasound based on a laptop computer hit the mark in China.

3. Build LGTs from the ground up, like new companies. Zero-based innovation doesn't happen without zero-based organizational design. GE's organizational "software"—its hiring practices, reporting structures, titles, job descriptions, norms for working relationships, and power balances between functions—all evolved to support glocalization. LGTs need to rewrite the software.

Tang and Koo constructed a business unit that managed a complete value chain: product development, sourcing, manufacturing, marketing, sales, and service. By recruiting locally, they were able to find most of the expertise they needed—including engineers with deep knowledge of miniaturization and low-power consumption and a commercialization team well versed in health care in rural China.

The LGT also decided that dealers—rather than the direct sales force used by

the premium ultrasound units—were the only cost-effective way to reach China's vast and fragmented rural markets and third-tier cities. And instead of relying on GE Healthcare's global customer-support and replacement-parts organizations, it built in-country teams that could provide quicker and less costly service.

4. Customize objectives, targets, and metrics. Innovation endeavors are, by nature, uncertain. It's more important to learn quickly by efficiently testing assumptions than to hit the numbers. So the relevant metrics and standards for LGTs—the ones that resolve the critical unknowns—are rarely the same as those used by the established businesses.

The ultrasound LGT knew that doctors in rural China were less familiar with ultrasounds than doctors in cities. But the team didn't know how much experience rural doctors had with the technology or what features would meet their needs. So it set out to learn how doctors reacted to the machines and what the obstacles to their adoption were. The team discovered that ease of use, especially in primary-care screenings, where doctors test for common local conditions, was even more crucial than anticipated. In response, the new business emphasized training, offered online guides, designed simpler keyboards, created built-in presets for certain tasks, and tracked customer satisfaction to gauge success.

In the midst of a severe global recession, GE's businesses in China will grow 25% this year, largely because of local growth teams.

Ishrak was careful to use different criteria to evaluate the performance of the LGT in China. For example, because the government approval process for new product releases is less intricate in China, he set much shorter product-development cycles than were common in wealthy countries. He also agreed to allow the size of the local service organization to deviate from the GE Healthcare's global standards. Since salaries are lower and service is more demanding in China, a bigger staff relative to the number of installed machines made sense.

5. Have the LGT report to someone high in the organization. LGTs cannot thrive without strong support from the top. The executive overseeing the LGT has three critical roles: mediating conflicts between the team and the global business, connecting the team to resources such as global R&D centers, and helping take the innovations that the team develops into rich countries. Only a senior executive in the global business unit, or even its leader, can accomplish all of that.

Even when it was tiny, the LGT in China reported directly to Ishrak. Because GE Healthcare had an ambitious product-development agenda for rich countries when the compact project was launched, the LGT's engineers might easily have been redirected to other projects if Ishrak hadn't shielded the team. He protected and even expanded the team's resources. By 2007 its number of engineers had grown from 13 to 70 and its total payroll had increased from 132 to 339. Ishrak also personally made sure that the team got the expertise it needed from other parts of GE, such as three highly respected development engineers from Israel, Japan, and South Korea. They worked full-time on the project and got it extra support from GE's R&D centers around the world.

Ishrak included the China LGT in the company's Ultrasound Council, a group of ultrasound executives and market and technology experts who meet for two days three times a year. At the meeting they share knowledge and insights and agree on which major projects to pursue. The council was instrumental in moving knowledge and technology into China.

Finally, Ishrak played a critical role in building a global market for the portable ultrasound. He identified potential new applications in the developed world and saw to it that the three units that sold the premium products aggressively pursued those opportunities.

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GE now has more than a dozen local growth teams in China and India. In the midst of a severe global recession, GE's businesses in China will grow 25% this year—largely because of LGTs. It's way too early to declare victory, however. Progress has been uneven. While some businesses—notably, health care and power generation and distribution—have taken the ball and run with it, others have been less enthusiastic. And though GE's R&D centers in China and India have increased their focus on the problems of developing countries, the vast majority of their resources are still devoted to initiatives for developed ones. So there is still a long way to go.

It's still necessary for the company's top executives to monitor and protect local efforts and make sure they get resources. It's still

necessary to experiment with people transfers, organizational structures, and processes to see what works. The biggest experiment is about to come: To speed progress in India, GE is creating a separate P&L that will include all GE businesses in that country and giving the new unit considerable power to tap GE's global R&D resources. It will be headed by a senior vice president who will report to a vice chairman. That's anathema in a company used to a matrix in which product comes first and country second. Nonetheless, the company is going to try it and see if it can create new markets. GE has to learn how to operate on a different axis.

The resistance to giving India its own P&L reflects what is perhaps GE's biggest challenge: changing the mind-set of managers who've spent their careers excelling at glocalization. Even the exemplars have a rich-country bias. In a recent conversation with Jeff, one such manager—the head of a major business that's doing well in India and China—still seemed preoccupied with problems beyond his control in the U.S. "I don't even want to talk to you about your growth plans for the U.S.," Jeff responded. "You've got to triple the size of your Indian business in the next three years. You've got to put more resources, more people, and more products in there, so you're deep in that market and not just skimming the very top. Let's figure out how to do it." That's how senior managers have to think.

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