

# Spend Less, Get More

**One thing India does better than China is high-tech research and development.**

**By Jason Overdorf and Sudip Mazumdar**

Newsweek International

Nov. 28, 2005 issue - The office of Dr. D. Yogeswara Rao, head of business development at India's Council of Scientific and Industrial Research, doesn't exactly look like a nerve center of cutting-edge research and development. Cluttered with stacks of documents and crammed with the tattered furniture common to New Delhi's government offices, Rao's domain looks like part of the landscape of old India.

But the humble surroundings can be deceptive. Despite a lack of funding and facilities—the government's entire R&D budget is a fraction of the annual research expenditure by a single multi-national company like Pfizer—India's researchers have shown the world they can innovate without breaking the bank. And that's attracting a great deal of interest. "Not a week goes by without some foreign delegation visiting us to discuss research collaborations," Rao says. Over the past six months, Rao's visitors have included representatives of Procter Gamble, Colgate, Johnson & Johnson and Alcoa, to name a few. The reason is simple. "Per dollar, the output of innovations is significant, so overall you may spend less, but you get more," says Rao.

Over the last five years more than 100 companies, including General Motors, Boeing and Mobil, have chosen India as an R&D hub, some of them citing local scientists' facility in English, as well as the country's superior track record in intellectual-property protection, as advantages over China. Prominent among them is General Electric, which has its largest research-and-development center outside the United States in Bangalore, India. Though GE also has an R&D center in China, its state-of-the-art John F. Welch Technology Center in Bangalore employs about 2,300 scientists, researchers and engineers, double the number in Shanghai.

GE's \$80 million Bangalore center does groundbreaking work in areas such as aerospace engineering, electronic systems, ceramics, metallurgy, advanced chemistry, chemicals, polymers and new synthetic materials. The center uses the latest technology and e-engineering tools to facilitate real-time global interaction with the company's affiliates, tech centers, customers and suppliers. "I have immense faith in the intellectual capital of India and the amount it can contribute to GE's success," says Scott R. Bayman, president and chief executive officer of GE India. "India is rich with bright, young talent."

GE's Indian researchers have applied for 260 U.S. patents on products such as synthetic materials and ceramics, with 37 approved by the U.S. Patent and Trademark Office, according to the company's spokeswoman in India. Motorola, which employs more than 1,700 Indian engineers and researchers, says Indian programmers develop about 40 percent of the software in its mobile handsets. The Internet

browser and multimedia messaging system for the company's 3G and GSM phones were conceived, engineered and delivered by its India operations.

India's software industry was first out of the gate in R&D, and increasingly important tasks were outsourced as India's so-called cybercoolies demonstrated their prowess. But today, a host of industries—including the automotive, chip-design, pharmaceutical and aerospace sectors—are taking advantage of India's giant pool of scientists and engineers, and not only to write program code. According to a recent study by PricewaterhouseCoopers, India is rapidly moving up from relatively routine tasks like converting schematics from one computer-aided design system to another, to sophisticated and critical functions like plant engineering and redesigning products for a better cost-performance ratio. Global automakers, in particular, which spend 3 to 5 percent of their annual revenue on R&D activities, are turning increasingly to India, the consultancy says.

The main reason for the shift is manpower—the oft-cited 300,000 engineers and 150,000 computer experts who graduate from India's many universities and technical institutes each year. But that's not where the country has the biggest advantage over China, which produces 400,000 engineers of its own annually. According to Indian business experts, local graduates have greater cultural affinity with Westerners (not to mention English-language skills) than their Chinese counterparts. Like that of the United States, India's growth has been driven by entrepreneurs and market forces rather than the government, so foreign business leaders perceive India managers as more market-savvy.

That affinity has also helped India gain an edge in intellectual-property protection. In a sector like chip design, for instance, large companies will outsource R&D activities only if they believe they can protect the intellectual property they are letting out the door. "The way you grow is by having contracts with bigger companies," says S. R. Dinesh, program manager of Frost & Sullivan's Asia Pacific electronics and semiconductors practice. "Intellectual-property law is a big issue. Even if multinationals outsource [to China], it will be at the lower end of the value chain."

The intellectual-property issue is also crucial to the global pharmaceutical sector, which spends about \$40 billion a year on drug development. Drug companies rise and fall on the strength of their patents for new blockbuster medicines. India's move to implement international patent laws earlier this year—despite the pain caused to domestic pharmaceutical giants like Ranbaxy, Cipla and Dr. Reddy's Laboratories, which had built their businesses by making generic copies of drugs protected by patents in the West—was roundly criticized by aid agencies worried about providing affordable retrovirals for HIV sufferers in Africa. But the decision sent a message that India was committed to playing by global rules, whatever the political cost.

India already has a well-developed pharmaceutical industry. With turnover of about \$7 billion—\$2.5 billion from export sales—the Indian pharma sector ranks fourth in the world in terms of sales volume and 13th

by value. The Chinese pharmaceutical industry, at \$8 billion in 2004 and growing fast, is about the same size. But the new commitment to patent protection may help India beat China in the race up the value-chain ladder in pharmaceutical research, says Vivek Mehra, executive director for PricewaterhouseCoopers in Delhi. Multinationals like AstraZeneca, Novartis, GlaxoSmithKline, Bayer, Pfizer and Roche set up modest research centers in India in the mid-1990s, and they've since grown substantially.

The fastest-growing pharmaceutical segment in India is so-called contract research, or the outsourcing of research-and-development activities. More than a dozen foreign contract-research companies—including Quintiles, ClinTec and PharmaNet—have set up operations in India, not only because it's inexpensive but also because India offers a large patient pool, trained doctors, good clinical diagnosis and a genetically diverse population for clinical research. Indian pharma giant Biocon, which set up a unit called Clinigene to conduct clinical trials for multinationals in 2000, has seen its contract-research revenue grow 45 percent over the past six months.

In spite of the gains, Chinese firms still apply for more patents annually than Indian firms, and some experts say India is weak in the area of fundamental research. The ties between academia and industry—needed to commercialize breakthroughs—must be strengthened if India is ever going to produce its own version of Silicon Valley. In the meantime, investment continues to roll in, and the demand for top graduates in technical fields is high. "The world has realized that if you don't have an India address [in R&D], you are in trouble," says R. A. Mashelkar, head of the government's Council of Scientific and Industrial Research. That's a boast, but one that's hard to argue with.