

Opportunities for Action in Operations

Globalizing R&D: Building a Pathway to Profits

THE BOSTON CONSULTING GROUP



Globalizing R&D: Building a Pathway to Profits

This is the second of two articles on opportunities in global research and development. The first, “Globalizing R&D: Knocking Down the Barriers,” is being published simultaneously.

Although many companies remain skittish about moving their research-and-development operations abroad, a number of global organizations are jumping at the chance to set up such operations in China, India, and other “rapidly developing economies.” The potential benefits are well known: a vast pool of high-quality, low-cost technical talent; increased access to foreign markets; faster development times; and improved overall R&D productivity.

But while the case for offshoring R&D can be compelling, making it work is an extremely challenging task—much more so than, say, offshoring a call center. Even today, there are only a handful of prominent success stories—those of companies that have fully or nearly fully captured offshoring’s full suite of benefits for R&D. Many other companies have tried hard to make the right moves but are achieving only lukewarm results. What differentiates the successful efforts from the rest?

Both The Boston Consulting Group’s own work and a survey we conducted of foreign R&D centers in China and India show that a few key decisions consistently play a major role in the outcome of investments. Specifically, we have found that tackling four critical issues up front tends to correlate strongly with success; conversely, companies that have overlooked or not yet come to grips with those issues have struggled. For managers now deciding how to move R&D

abroad, here is a quick look at the four issues and some of the key decisions to consider.

What Role Will the New R&D Center Play?

In our experience, successful companies start with a very clear idea of the role to be played by the new center, as well as how it will evolve. Instead of a one-size-fits-all approach, there are at least three models to examine:

- A *competency model*, in which a center is developed around a set of skills or competencies (for instance, 3D modeling, testing, and simulation). General Motors' center in India, which provides specialized math-based modeling and analysis to the company's R&D centers in the United States and Asia, is patterned on a competency model.
- A *product model*, in which a center plays a direct role in supporting a particular product strategy. A successful example is General Electric's R&D center for its automation and control products in India. This group started with low-end 3D modeling but has scaled up to full product-design capability in less than four years.
- A *hybrid model*, which draws elements from both the competency and the product models. This may be the most attractive and sustainable model because the competency model alone tends to provide limited career or growth potential for the local R&D staff, while the product model alone sacrifices some of the potential cost savings of the competency model. But getting the right balance of elements is hard to achieve. It may be best to start with the competency model and evolve into a hybrid by adding complete product-development capabilities—

particularly for products meant for the local market rather than for other regions. After all, you wouldn't design a car intended for India or a mobile phone intended for China in, say, Paris or Detroit.

Although roles usually evolve over time, management must clearly define each center's starting position, since each model has different requirements, time frames, and benefits. The differences in the value created and the overall business case offered by the three models can be substantial.

Which Activities Should We Offshore, and When?

Determining exactly which R&D activities to offshore, and when, is another critical decision. In one case, we found that depending on what process or time frame the company looked at, the existing R&D headquarters would need to spend anywhere from 12 to as much as 25 percent of its total capacity simply in training a new offshore center's engineers. Clearly, then, the decision about what and when will have significant implications for the costs of the move and for the overall value created.

There are four elements that companies should factor into their feasibility and timing decision:

- *Independence*: the need for collocation, the required level of interaction with other project members or partners, and the extent of standardization
- *Complexity*: the degree of technical competency required and the potential value added
- *Criticality*: the potential competitive advantage provided; the risk of failure; the pressure of time

constraints; the need for data confidentiality, high-quality processes, and protection of intellectual property rights; and the risk of losing internal competencies

- *Benefits*: the potential for cost savings, increased revenues, and improved product quality, as well as a greater focus on core activities

Typically, successful companies first offshore processes that score high on *independence* and *benefits*. For instance, according to a BCG global survey of senior executives, activities such as 3D modeling, engineering design and analysis, and technical documentation are usually among the first to be offshored. These activities tend to be both the easiest to move and the easiest from which to secure benefits. *Complexity* is traversed next, and *criticality* last. As an example, higher-value-added activities like component design are usually offshored further down the road, and mission-critical activities such as full-fledged product development are likely to be offshored last. (See *Innovation 2005*, a BCG Senior Management Survey, March 2005, on innovation and the innovation-to-cash process.)

Where Should We Locate the New R&D Center?

Obviously, different locations present different opportunities. China and India are cases in point. Most multinationals that have established R&D centers in China have specific objectives: gaining access to the country's large domestic market through product localization and customization; supporting local sourcing and manufacturing for both regional and global markets; and developing research capabilities to create new technologies and standards. Companies that have entered India, on the other hand, have sought to take

advantage of its low-cost technical talent, large English-speaking work force, and Westernized management processes. Their primary focus has been on design and engineering support for global product R&D; software design and development; and, more recently, prototyping, testing, and industrialization.

Other countries offer different advantages. Russia, for example, is a leader in aerospace, energy, and chemistry. However, decisions about location are never simple or straightforward. For instance, GE established a research center for its aircraft-engine business in India even though the country is a relatively unattractive market for such products. Why?

The explanation lies in taking the analysis beyond the obvious factors of cost, connectivity to existing R&D facilities, proximity to target markets, degree of IP protection, and government policies. Those are all key issues, yet the most successful companies—such as GE—also look closely at a wide range of additional criteria, among them the availability of talent, technological capabilities, the educational system, and cultural diversity. Other factors often include the proximity to existing and planned manufacturing centers, as well as to areas where new ideas are emerging, such as major academic centers or new-business hot spots. As one might expect, successful companies tend to explore all the possibilities and analyze each of the many tradeoffs before making a choice that best fits their own capabilities, assets, and objectives.

How Can We Ensure That the New R&D Center Will Be Used?

Surprisingly, one of the biggest challenges for an off-shore R&D center can be to create enough demand for its services from the parent organization. Many

centers are launched with the expectation that they will be used heavily and grow rapidly. Instead, plans are often scaled down quickly after managers at existing R&D centers fail to support the new center actively during its start-up phase.

Both top-down and bottom-up approaches are necessary to overcome the inevitable internal resistance and to ensure a quick ramp-up. The top-down approach involves creating a shortage of capacity in the parent center that makes it unable to meet the company's overall demand for R&D. For instance, the head of R&D at one company froze the organization's total R&D budget, despite a growing list of planned projects, and offered to underwrite the offshore R&D center by providing its services "free" to product managers. As a result, the offshore center was utilized extensively, and it quickly gained credibility. The complementary, bottom-up approach links offshore teams directly with teams from the parent center. One successful approach we have seen is to have the offshore team for a particular process or product report to the head of the global team for the same division.

* * *

Of course, companies must address hundreds of issues before offshoring something as critical as R&D. For instance, as demand for help from a new R&D center grows over time, the demand on the center's competencies grows with it. So companies need to develop recruitment and training plans for their offshore centers right from the start. Similarly, information technology issues should not be underestimated. New R&D centers in rapidly developing economies require the same sophisticated tools found in R&D centers back home: an IT architecture that supports communication and real-time problem resolution. Just as important, managers should develop ways to

define and track standard operating procedures and performance metrics for each process, subprocess, and activity. Such a system eliminates subjectivity when conflicts arise between teams with different backgrounds and cultures that are working far apart from each other.

But the four questions covered here are a good place to start. Successfully capitalizing on the potential of global R&D is more than merely a matter of moving quickly or aggressively. Turning the potential into profits also requires a well-planned, comprehensive approach. Success is not as simple as just showing up—but neither is it a mystery.

Arindam Bhattacharya
Harold L. Sirkin
James P. Andrew

Arindam Bhattacharya is a vice president and director in the Mumbai office of The Boston Consulting Group. Harold L. Sirkin and James P. Andrew are senior vice presidents and directors in the firm's Chicago office. The authors received assistance from Philippe Roch, a manager in BCG's Paris office, and Sumeer Chandra, a manager in the firm's Mumbai office.

You may contact the authors by e-mail at:

bhattacharya.arindam@bcg.com

hal.ops@bcg.com

andrew.james@bcg.com

This article is cosponsored by BCG's Operations and Industrial Goods practice areas.

To receive future publications in electronic form about this topic or others, please visit our subscription Web site at www.bcg.com/subscribe.

© The Boston Consulting Group, Inc. 2005. All rights reserved.

Other BCG publications on innovation and creating global advantage include:

Innovation 2005, a BCG Senior Management Survey, March 2005

“Don’t Be a Schwinn,” BCG Perspectives, February 2005

The Central and Eastern European Opportunity: Creating Global Advantage in Serving Western Europe, BCG Focus, January 2005

Navigating the Five Currents of Globalization: How Leading Companies Are Capturing Global Advantage, BCG Focus, January 2005

Facing the China Challenge: Using an Intellectual Property Strategy to Capture Global Advantage, BCG report, September 2004

“Making Innovation Pay,” BCG Perspectives, May 2004

Capturing Global Advantage: How Leading Industrial Companies Are Transforming Their Industries by Sourcing and Selling in China, India, and Other Low-Cost Countries, BCG report, April 2004

“Innovating for Cash: Lessons from the Handset Wars,”
Opportunities for Action, January 2004

“Innovating for Cash,” BCG Perspectives, December 2003
(adapted from the authors’ article by the same title that appeared in the September 2003 issue of the *Harvard Business Review*)

“Boosting Innovation Productivity,” Opportunities for Action,
April 2003

THE BOSTON CONSULTING GROUP

Amsterdam	Houston	Prague
Athens	Istanbul	Rome
Atlanta	Jakarta	San Francisco
Auckland	Kuala Lumpur	Santiago
Bangkok	Lisbon	São Paulo
Barcelona	London	Seoul
Beijing	Los Angeles	Shanghai
Berlin	Madrid	Singapore
Boston	Melbourne	Stockholm
Brussels	Mexico City	Stuttgart
Budapest	Miami	Sydney
Buenos Aires	Milan	Taipei
Chicago	Monterrey	Tokyo
Cologne	Moscow	Toronto
Copenhagen	Mumbai	Vienna
Dallas	Munich	Warsaw
Düsseldorf	Nagoya	Washington
Frankfurt	New Delhi	Zürich
Hamburg	New York	
Helsinki	Oslo	
Hong Kong	Paris	

BCG

www.bcg.com

5/05

