



HOW TO SPARK R&D INNOVATION

# The Benefits of Science Collaborations

By BRUNO CASSIMAN

There is considerable evidence that firms with links to external science and research are more likely to be at the forefront of innovation – and more often named on patent applications – than those lacking similar ties. These ties, dubbed "science linkages" by researchers, vary in quantity, style and complexity, but corporations may create them by accessing publicly available scientific information; partnering with universities and public research centers; citing scientific literature in patent applications; and publishing their own scientific literature, often in cooperation with university researchers.

The IT giant Indra is one example of a company that is conducting a series of University Collaboration Projects in conjunction with several Spanish universities. Each project focuses specifically on innovating a new product designed to make it easier for those with physical disabilities to access today's technologies. One example is the Headmouse, which enables physically disabled users to control their computer simply by moving their heads. Not only does the collaboration naturally complement the firm's corporate vision and create a niche market, it also has the added benefit of boosting the company's positive PR.

Sounds good, so why aren't more firms doing it? There's certainly no shortage of science in Europe, but for some reason European firms have generally lagged behind those in the United





States when it comes to connecting industry and science. In the U.S., industry support of university research accounts for some 10 percent of all research performed by colleges and universities there, more than double what it was a decade ago, according to one estimate by Charles F. Larson of the Industrial Research Institute in Washington, D.C. In these restrained times, many U.S. companies are retrenching by sticking to their core competencies and contracting additional capabilities through partnerships with universities: this is especially true for technology, which has always posed complex and expensive challenges to develop, and is only getting more so.

As Luis R. Mejia and Kirsten Leute noted in the book, *The Creative Enterprise*, "In today's globally competitive environment, it is more imperative than ever that (industry) increase the rate of utilization of university-based research results. ... (Companies) can leverage university technology to bring new and better products to the market faster and cheaper than if they continue to try to innovate all their product pipeline needs themselves. Indeed, companies do not have to look hard to find clear evidence that commercializing university-spawned technologies can be an astute corporate strategy. Some of the most important commercial products of the 20th century owe their success to the university researchers who gave them technological birth." The authors cite Hewlett-Packard, Sun Microsystems, MIPS, Yahoo and Google, along with one of the best-known partnerships, the knowledge transfers between Stanford University and industry players that gave rise to "the Silicon Valley creature."

Though Europe has not yet matched the United States in terms of sheer volume, the continent is by no means unaware of the advantages of leveraging university ties to create high-impact businesses. As a consultant to the European Commission and the Belgian government on matters of innovation policy, as well as my work with company executives on matters of innovation strategy, I have been keen to explore the value of science linkages to companies further. One study analyzed 842 Flemish manufacturing firms about their engagement in a variety of research partnerships with either universities or governmental research centers. Another looked at 52 R&D partnership projects worldwide started between 1998 and 2003 by ST Microelectrics, Europe's largest and one of the world's leading semiconductor manufacturers. For both these studies, my colleagues and I examined the varying types of science linkages prevalent in each firm, and the relationship of the types and quantity of those linkages to the quantity and quality of the firm's innovations.

Having explored the potential costs, complexities and components of successful university/industry collaborations, I believe that we have identified the key considerations that will help stimulate more of these connections and make them work for your firm.




## EXECUTIVE SUMMARY

**With so much belt-tightening** going on, pouring precious financial resources into partnerships with universities might seem an unnecessary extra. But think twice before cutting these long-term R&D investments: the money you save today could be the innovation, and consequently, the competitive edge, you lose tomorrow.

The author examines the integral role university research can play in industry innovation. To enjoy the fruits of your alliance, your firm and your research partners must share complementary goals – and carefully lay the groundwork for a healthy and productive long-term relationship.

The long haul is essential, he stresses, as the real value of these university links can be the unexpected results yielded over time. What's needed is a proper framework to balance the myriad issues involved, so that you can protect your firm from the competitive issues while leveraging the cooperative ones in these testing times.


## Factors That Favor Collaboration

First, we must acknowledge that some firms are more likely to cooperate with outside researchers and universities than others. We know that some industries share intrinsic values and goals with academia – technology, pharmaceuticals and bioscience most readily spring to mind.

But business sector alone isn't necessarily a predetermining criterion for collaboration. Perhaps what those scientific disciplines learned first, and what other sectors are fast cottoning on to, is that some of the most exciting discoveries and biggest advances of recent decades have emerged as a direct result of dynamic interfaces bridging different fields. Among businesses that have cooperative agreements with universities, we have found some common denominators that cross sectoral divides.

Typically, these firms *avail themselves of public scientific information sources.* This is particu-





larly relevant for firms that are unwilling or unable to venture into formal collaborations with universities because they fear losing control of proprietary information, especially if that information and any research surrounding it would enhance their own competitiveness. If that's the case, companies can at the very least use publicly available scientific information to inform their own innovation efforts, and publish their own scientific research as well.

Firms that do establish formal relationships are *generally large rather than small- or mid-sized*. As the U.S.-based Business-Higher Education Forum explains, smaller companies "often do not have the personnel to manage, or the money to fund, outside relationships of much magnitude and complexity." This factor has influenced the E.U. to set up special programs to make collaboration between universities and small- and medium-sized firms highly prized.

Apart from the size factor, we've found that *distance matters* in the establishment of these relationships, meaning that companies are sometimes reluctant to partner with universities abroad.

Firms that partner with universities are usually *engaged in other types of research collaborations* as well. They may be directing their own in-house research or carrying out joint studies with external customers or suppliers. Given the high costs for research and development, understandably they are looking for partners with whom to share this burden.



## Frequent Forms of Collaboration

What form, or forms, do these collaborative efforts take? One of the most frequent ways that companies and universities work together is through *sponsored research*. For example, in 2005 GlaxoSmithKline Australia began offering postgraduate support grants of up to $15,000 a year for two years to doctoral or post-doctoral students performing health research on new vaccines, cancer, cardiovascular diseases and a variety of other biomedical fields. In return, grant recipients agree not to accept funding from any other commercial sources, to provide Glaxo with copies of their research findings and to acknowledge Glaxo's contribution in any presentations.

Henkel has set up a *scientific advisory board* for its adhesives group, with university professors as members. The board meets a few times a year to discuss Henkel R&D projects and scientific advances in Henkel's areas of expertise. The board members also have important links to industry, making them potential suppliers and clients for Henkel, based on these new technologies. Alongside this, Henkel has cultivated an *external network of experts* made up of university scientists working in areas of potential interest to Henkel. The existence of such a network facilitates interactions whenever Henkel scientists want to bounce around ideas or need help on a particular project.

Another form of interaction is what Rolls-Royce has done, joining forces with a number of universities in the United Kingdom and around the world to create "university technology centers." Within these centers, company and university staff conduct joint research in a variety of engineering disciplines. This type of *common-interest collaboration* grants Rolls-Royce access to the best and brightest minds in engineering, enabling the company to achieve much more than fulfill its historic role as an exclusive carmaker, but also providing global leadership in aerospace systems and energy solutions. At the same time, universities benefit from unique access to Rolls-Royce resources and capabilities.

## Benefits of Partnership

Regardless of what form the university/industry collaboration takes, the primary goal of any research partnership is to streamline processes. And while an improved bottom line is a very

### ABOUT THE AUTHOR

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