The Change Leader's Toolbox...page 72 Biotech's Failed Promise...page 114

Harvard Business Review

www.hbr.org

October 2006

# Lessons from Biotech

by Gary P. Pisano



universities, investors, customers); the institutional arrangements that connect these players (markets for capital, intellectual property, and products); and the rules that govern and influence how these institutional arrangements work (regulations, corporate governance, intellectual property rights). For biotechnology to fully succeed, its anatomy must help the players collectively to excel in three ways: managing risk and rewarding risk taking, integrating the skills and capabilities that res range of disciplines and functi advancing critical knowledge a ganizational and industry level

The parts of an industry's a should support one another i ing these challenges. In biote work at cross-purposes. For exa way the industry manages and risks – how businesses are fund flicts with the long R&D ti needed to create new drugs. T mented nature of the indust scores of small, specialized playe far-flung disciplines, is a potent ful model for managing and re risk, but it has created islands tise that impede the integratio ical knowledge. And biotech's market for intellectual property, which allows individual firms to lock up the rights to basic scientific knowledge, limits the number of scientists who can advance that knowledge by learning through trial and error.

While all this sounds pretty gloomy, it does not mean that the industry is doomed. It does not mean that science cannot be a business. It does mean that biotech's anatomy needs to change – an undertaking that would have a major impact not only on drug R&D and health care but also on university- and government-funded scientific research, other emerging industries engaged in basic science, and the U.S. economy. The purpose of this article is to provide a framework for such an undertaking and to offer some ideas about the new organizational forms, institutional arrangements, and rules that will be required.

## The Biotech Experiment

Science-based business is a relatively recent phenomenon. By "science-based," I mean that it attempts not only to use

> "For biotechnology to fully succeed, its anatomy must help the players to collectively excel in three ways: managing risk and rewarding risk taking, integrating the skills and capabilities that reside in a range of disciplines and functions, and advancing critical knowledge at the organizational and industry levels."
>
> **Gary Pisano**
>
> *Gary P. Pisano is the Harry E. Figgie, Jr., Professor of Business Administration at Harvard business School in Boston*

to expand basic scientific knowledge was the province of universities, government laboratories, and nonprofit institutes. Commercializing basic science – using it to develop products and services, thus capturing its value – was the domain of for-profit companies. Historically, a handful of companies, including AT&T (the parent of Bell Labs), IBM, Xerox (the parent of the Palo Alto Research Center), and GE, did some remarkable research, but they were the exception. By and large, businesses did not engage in basic science, and scientific institutions did not try to do business.

The biotech sector fused these two domains, creating a science-business

seek commercial partners to license the patents; and they partner with venture capitalists in spawning firms to commercialize the science emanating from academic laboratories.

In numerous instances, the boundary between a university and a biotech firm is blurred. The founders of a substantial number of biotech firms include the professors (many of them world-renowned scientists) who invented the technologies that the start-ups licensed

The science business was born in 1976, when the first biotech company, Genentech, was created to exploit recombinant DNA technology, a technique for engineering cells to produce human proteins. It was founded by Robert Swanson, a young venture capitalist, and Herbert Boyer, a professor at the University of California at San Francisco who had coinvented the technology. In addition to demonstrating that biotechnology could be used to develop drugs, Genentech created a model for monetizing intellectual property that has proved remarkably powerful in shaping the way the biotech industry looks and performs. This model consists of