

Life Science—A

Decade of Change



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Life science is a term we hear applied to everything from cloned livestock, genetically altered grain to tasty drinks with medicinal properties and breakthrough pharmaceuticals. There are three main categories of science: Physical Science, Earth Science, and Life Science. The purpose of this article is to summarize life science's origins and review the changes that have occurred in the life science industry—making it an ever more popular industry for us to watch and assist in the coming years. As the financial markets spiral downward, there are some industries which continue to expand, although ever so slightly. The life science industry is an example of an industry that will represent a much-needed bright spot on the commercial real estate horizon.

DNA—Cracking the Code

Just a half century ago, very little was known about the genetic factors that contribute to human disease. The field of life science was

born on April 25, 1953, when *Nature* published “Molecular Structure of Nucleic Acids, a Structure for Deoxyribose Nucleic Acid” by James Watson and Francis Crick. Crick and Watson eventually won the Nobel Prize for discovering that DNA was a double helix that seemed to offer a copying mechanism for genetic material.¹

Experiments were conducted around the world during the 1960s and 1970s in efforts to determine the order, or sequence, of the chemical letters found in DNA. Little progress was made however, because of the lack of collaboration between researchers. In the 1970s, a method was developed to determine the sequence of DNA pairs, but this was only the tip of a vast universe.

Human Genome Project

The National Institutes of Health (NIH) (part of the U. S. Department of Health and Human Services)—together with the Department of Energy (DOE) and the National Academy of

Sciences—sought a better way to pursue further DNA study. NIH assumes primary responsibility among federal agencies for conducting and supporting medical research. NIH scientists investigate ways to prevent, treat, and even cure diseases and provide leadership and financial support to researchers in every U.S. state and throughout the world.²

Life Science Location Trends

Innovations in biotechnology drove the investment and development of biotechnology companies in the United States. In the mid 1980s, biotechnology firms grew, first in the San Francisco Bay area where it was first discovered that DNA could be cloned. Soon other key markets including Maryland, Massachusetts, New Jersey, New York, and Pennsylvania began to see growth of this budding industry known as life science. What caused these off-shoots to form outside of California? Biotechnology companies developed location criteria which included proximity to universities, proximity to existing pharmaceutical companies in major metropolitan areas, and access to top scientific talent, funding sources, and venture capital firms.

In the mid-1990s, “cluster developments” became the catch phrase as the biotechnology industry began to leave the laboratories on university campuses and established their own hybrid laboratory environments in suburban communities. These clusters were fueled by promising research and the investment interest of the financial community. States used their economic development subsidies and utility companies created rebate and grant programs to attract this promising new industry. The Washington, D.C., and greater Baltimore, Maryland area, as well as the New Jersey/New York and Philadelphia corridor were home to many of these facilities. These areas have a concentration of top university resources, highly-educated people, and the financial resources required by this scientific industry. The industry continued to grow with the influx of private equity and NIH funding, which is necessary to fuel the

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needed startup capital and operating expenses as these hybrid businesses steered their formulations through Food and Drug Administration (FDA) trials.

Beginning in the mid-1990s, forward-thinking real estate brokers worked to serve this new demand. Initially, biotech facilities were 10,000 to 20,000 square feet requiring specific height and power requirements and necessary expansion capabilities. Often these fast-growing companies—or “gazelles,” as they became known—would double and triple in size in three-

year cycles. As they increased in size, they required larger, more sophisticated environments to compete in the growing industry sector.

The challenge for real estate firms was to anticipate the growth cycles, articulate those specifics to the architect and ownership, and build in flexibility as these units grew and contracted over time. Many a developer got caught as this new hybrid facility began to populate the landscape. Few biotech companies succeed in the long run, and the rate of failure in the industry has been compared with that of the restaurant business, thus early stage biotechnology can be a risky investment for all.

Similar to the dot.com industry expansion—that was occurring simultaneously—the biotechnology/life science revolution fostered optimism, drew financial speculation, and led to subsequent real estate investment. Capital markets began to take note of incubator companies promising future marketable formulations. However, unlike the situation with new dot.com firms, launching a life science company requires more of an investment than a phone, desk, and computer.

Strategic partnerships provided the life science businesses with needed capital for research and development. Alliances developed between Big Pharma and Biotechnology that went something like this: Capital was provided and offset by a percentage of the final product for a licensed period of time. Once these laboratory formulations were approved by the FDA, Big Pharma was able to

provide marketing support and manufacturing of these formulations into drugs. Big Pharma has in place a vast support system which they would trade with the life science business. The new drugs would be placed on the market through a collective, collaborative process.

In effect, life science companies are the fuel that ignites the creative research and development of large drug companies, providing formulations in their pipeline through the research and development phase. The partnership between life science firms and large pharmaceuticals allows both to profit on their collective investments, provide new drugs to market, and offer favorable returns to shareholders and Wall Street. In addition the steady growth in the NIH budget has had a dramatic impact on federal support for medical research. As a result of the rapid advances in technology, much of the medical device/laboratory equipment sector has remained in a state of healthy growth.

Baby Boomers and the Human Genome “Catalogue”

Baby boomers are fueling an increasingly demanding and affluent population. However, as they become older, they are facing a growing likelihood of chronic diseases. Baby boomers want to live longer, healthier lives. They want to eliminate chronic diseases, and they want to do it in their lifetimes. Baby boomers want drug companies and the life science industry to solve their problems.

Although boomers represent a large part of our population, all demographic sectors are seeking the opportunity for healthier and extended, productive lives. The biotechnology revolution is being fueled by our collective wants—and the retail consumer market is anxious to meet the need. Stressed out and can't sleep? “Dreamerz,” a chocolate drink that tastes great and is sleep inducing, is part of a growing area of the life science industry that blends drug formulations with food products and chemical flavorings. Collaborations—by way of

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strategic partnerships among food companies, drug companies, venture capitalists, life science firms, and other investors—continue to support this increasing beauty, health, and wellness sector.

One of the biggest stories of 2003 was the bid from General Electric to purchase Amersham, the largest and most successful global diagnostic imaging and life science company. The two companies' combined revenues in 2003 were projected to be more than \$13 billion. General Electric believed that it could create a

health care company with broader expertise in imaging, diagnostic pharmaceuticals, and drug discovery than its competitors.

Where Are Biotechs Now?

The San Francisco Bay Area continues to hold the strongest and richest cluster of life science companies in the United States; 64 percent of the entire industry is represented by the city's 77 life science firms, whose estimated revenue is \$148.6 billion. Boston, with 15 percent of the market, is home to the next highest concentration. States with large concentrations of collaborating Big Pharma and life science companies include Maryland, New Jersey, New York, and Pennsylvania. In addition, Singapore has emerged as a global market for the industry.

California and New Jersey provide illustrations of how state investments can drive location decisions. In June 2008, New Jersey passed a \$270 million stem cell research program and California has a \$3 billion stem cell initiative.

The Future—Life Science Trends and Market Dynamics

Ernst & Young's *Global Biotechnology Report 2008*³ indicates robust investment in the industry, with record levels of financing and deal making in 2007. Investors and strategic partners showed strong confidence despite tightening global financial conditions that continued to test the industry in 2008.

According to Ernst & Young, investors are being drawn to the tremendous value of life science innovation. For example, as noted in the company's 21st anniversary report on the biotechnology industry, *Beyond Borders: Global Biotechnology Report 2007*,⁴ “. . . strong product pipelines and product success, record-breaking financing totals, unprecedented deal activity, and impressive financial results mark historic industry advances.”

One of the potential difficulties looming in the future is the slowing of product approvals because of recent safety concerns resulting from unintended uses of drugs already approved by the FDA.

Equally distressing is the continued resource constraints faced by the FDA. The Ernst & Young *Beyond Borders* report examined three key trends that are transforming business models and the nature of competition for biotechnology and pharmaceutical companies.

- *Reinventing Big Pharma*: At the same time that they are attempting to boost their earnings, large pharmaceutical companies face continued patent expirations.⁵ To counteract patent expirations they are cutting costs by consolidating their workforces, pulling out trapped revenues associated with non-core properties through sale leasebacks, and consolidating and selling surplus assets that have become functionally obsolescent. The Ernst & Young report points to the obvious conclusion that this method will buy Big Pharma only limited time. The long-range goals of these companies require fundamental changes in how they do business. They should alter their business structures and incentives to improve productivity, incorporate creative business models that permit increased flexibility, and negotiate a larger share of revenue from products they help to create.

- *Rise of Personalized Medicine*: Personalized medicine is being hastened by business drivers such as pricing measures and safety concerns. The *Beyond Borders* report predicted that personalized medicine will lead to fundamental changes in the competitive landscape, altering the bargaining power of small and large drug companies alike.

- *Globalization*: Similar to personalized medicine, globalization is radically changing the traditional competitive advantages of pharmaceutical and biotechnology companies. “[In 2007], there was

cautious optimism in the European biotech industry—as the sector emerged from a prolonged period of restructuring,” according to Siegfried Bialogan, Ernst & Young Germany biotechnology leader. “Double-digit revenue growth and sustained success across multiple measures proved Europe’s biotech sector has bounced back.”⁶

What makes the Ernst & Young *Beyond Borders* report (now in its 22nd year) truly unique is that its surveys are conducted with direct market response of more than 400 biotechnology CEOs at small, midsize, and large biotech companies. Survey respondents were very optimistic regarding the maturing biotechnology industry. According to the report, 94 percent indicated that they planned to hire new talent in the upcoming two years. Sixty-eight percent indicated that these CEOs would introduce new products in the coming 24 months.

The true globalization of the pharmaceutical and biotechnology industries will fuel future alliances in emerging markets. Life science companies must compete on a global scale and address production, distribution, safety, and patent issues unimaginable a decade ago. The Council for Supply Chain Management Professionals (CSCMP) continues to share topics of Big Pharma and their ever changing distribution requirements utilizing 3PLS and direct ship carriers. It will take time and trust to achieve, but a working collaborative structure, collective sharing of ideas, and utilization of technological advancements eventually will lead to exciting developments in the life science industry. This optimism is truly good news in the context of a generally slowing and uncertain commercial real estate market.

Endnotes

1. Ottewell, Sean, “Exploring Bioinformatics” market report (<http://www.eurograduate.com>).
2. NIH home page (<http://www.nih.gov>).
3. Ernst & Young, 2008 *Global Biotechnology Report*.
4. Ernst & Young, “Global Biotechnology Makes Historic Advances” (2007 press release).
5. Ibid.
6. Ibid.