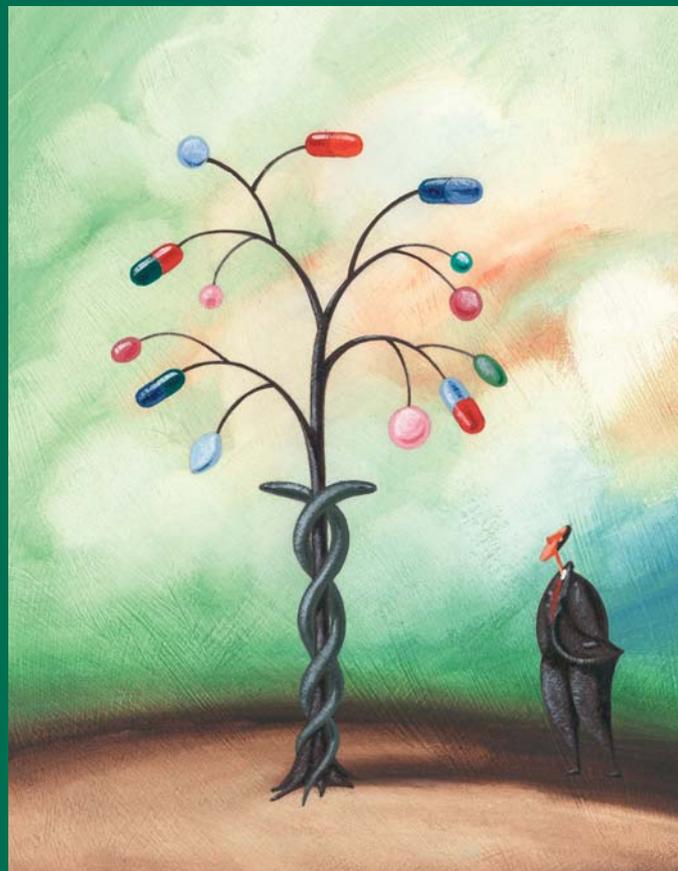


# FOCUS

## Capitalizing on the Crisis

New Ways to Create Value in Biopharma



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# Capitalizing on the Crisis

## New Ways to Create Value in Biopharma

**A** global climate change has been under way for some time in the biopharmaceutical industry. This shift is eroding the general business environment—and hence investor confidence and share values—while also destabilizing traditional business models and threatening the survival of many of the inhabitants of the industry’s ecosystem. Underlying this climate change have been such factors as a decline in R&D productivity and a rise in regulatory and price pressures. And now the industry is facing a new set of anxieties: the credit crisis, the imponderable outcome of health care reform in the United States, and the rapid succession of patent expiries. But in uncertainty lies opportunity. Those that can adapt and evolve in the new economic environment could end up thriving in it.

Consequently, today’s leading biopharma companies must make fateful choices. They might choose to diversify—by continuing to serve multiple therapeutic and geographic markets while expanding into new areas such as emerging markets or generics. Or they might choose to pursue a strategy of focus—by targeting specific customer markets or

disease areas. Different strategies will affect shareholder value in different ways. In analyzing the possible choices and their consequences, we have reached several conclusions that challenge conventional wisdom regarding the best path to value creation in biopharma.

### Evidence of Climate Change

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The changing fortunes of the biopharma industry may seem puzzling at first sight. Leading biotechnology and pharmaceutical companies continue to generate large amounts of cash even though investors have been losing faith in the industry’s prospects for several years. The reasons behind this new era of diminished expectations are complicated.

First, the leading companies in the industry are facing a so-called patent cliff: one after another, the lucrative drugs that have driven industry growth since the 1990s are reaching the end of their patent life.

Second, investments in R&D are delivering diminished returns. A mere five years ago, industry executives could expect every dollar invested in discovering new therapeutics to yield a risk-adjusted return of 15 percent

or more. Yet today, despite a wealth of new scientific discoveries, returns on R&D in biopharma have fallen to 11 percent or less, a rate barely covering the cost of capital. Why have returns fallen so far, so fast? One prominent cause is the dramatic rise in the failure rate of late-stage clinical trials: since each late-stage clinical compound represents nearly \$1 billion in cumulative investment, each late-stage failure represents a financial catastrophe for a biopharma company.

Third and finally, the market into which new drugs are being launched is becoming increasingly competitive. Burdened by ever-increasing demand for health care while also enjoying an ever-wider range of drugs to choose from, governments and other buyers of health care are placing ever-tighter pressure on drug companies. Getting a drug on the market is no longer just a matter of proving its clinical efficacy—a company must now prove the product’s cost effectiveness as well.

In light of these developments, investors have been justified in revising their beliefs about the efficiency of biopharma’s innovation engine—and hence about the entire future value of the industry. The extent to

which investors have revalued the industry is illustrated in Exhibit 1, which shows the steady decline of the industry's price-to-earnings (P/E) ratio, a measure of investor confidence in future profit growth.

How are biopharma executives to respond? Of course, they can continue to conduct business as usual and tough it out. Or they can stay the course but help matters along by embarking on a campaign to enhance efficiency and productivity broadly throughout their organization.<sup>1</sup> Or they can even *change* course and adopt a different strategy that seems better suited to the changing climate.

To test the validity of a range of different strategic choices, we considered a hypothetical yet realistic top-ten biopharma company and posed

the question, How could this company be transformed to enhance value creation? To answer this question, we used total shareholder return (TSR), tracked over a ten-year timeline, as a yardstick for value creation. (For more about our methodology,

Companies can even change course and adopt a strategy that seems better suited to the changing climate.

see the Appendix.) TSR is the best metric for this analysis, as it not only captures direct revenue and earnings growth but also registers the impact of financial factors and suggests how changes in strategy would likely be viewed by investors and reflected in share values.

## Possible Strategic Adaptations

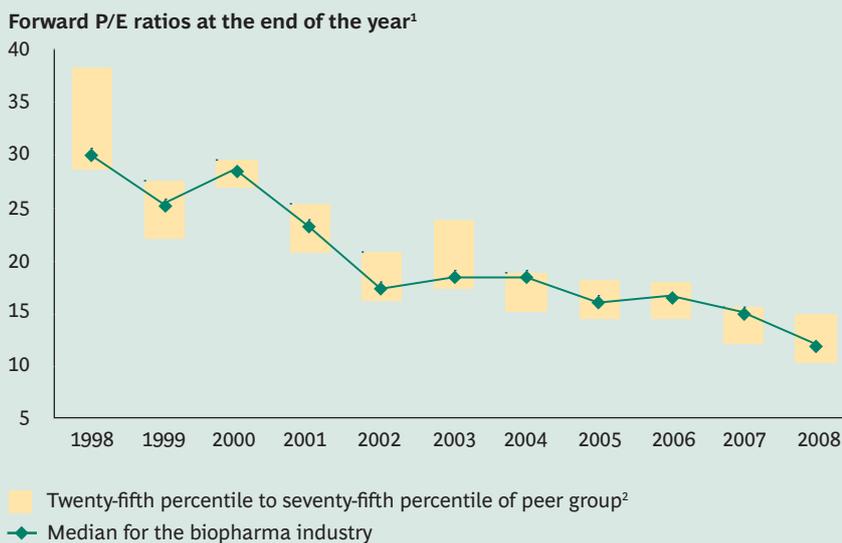
Competitive advantage remains the key to success in the biopharma industry, but what forms might it take in today's environment—and tomorrow's? This question is widely discussed at industry conferences and in the pages of business publications such as *The Wall Street Journal* and the *Financial Times*. Nearly all industry observers and leaders agree on one basic principle: cost savings and efficiency are crucial. Accordingly, biopharma sales forces in the United States, for example, have been cut back sharply: in 2008 alone, the field force in the United States lost 10 percent of its membership—about 10,000 reps.<sup>2</sup>

In addition to this emphasis on improving efficiency, however, commentators and executives often venture more drastic ideas—calling for serious changes to the industry's standard approach. These ideas tend to fall into four main types—at least three of which have already been adopted by one or more companies.

1. It may seem counterintuitive, but enhancing R&D productivity may not be the panacea many executives are hoping it will be. Our analysis suggests that significant overcapacity in R&D already exists throughout the industry. Over the next 20 years, the potential demand for new innovative therapies suggests a \$1.2 trillion market (in 2008 dollars)—an estimate roughly in line with the expected output of the current level of R&D spending in the industry, and the current (low) level of R&D productivity. But if, as expected, R&D spending continues to grow as a percentage of revenue or R&D productivity improves, the supply of new drugs could quickly outstrip the potential for the global market to absorb them, with supply possibly as much as 1.5 to 2 times higher than demand.

2. *American Medical News*, March 23, 2009, accessed at the site <http://www.ama-assn.org/amednews/2009/03/23/prl10323.htm>.

### Exhibit 1. Investors' Expectations for the Biopharma Industry Have Been Declining in Recent Years



Sources: Compustat; BCG ValueScience Center; BCG analysis.

<sup>1</sup>Forward P/E ratios are calculated using the next 12 months' earnings.

<sup>2</sup>The companies reflected in these data are Abbott, AstraZeneca, Bristol-Myers Squibb, GlaxoSmithKline, Johnson & Johnson, Eli Lilly and Company, Merck, Novartis, Pfizer, Roche, Schering-Plough, and Wyeth.

- ◇ Some companies are homing in on areas of high unmet need in markets with limited numbers of patients and physicians. We call this the *specialty blockbuster* approach.
- ◇ Others are occupying therapeutic niches, such as ophthalmology or HIV, in which they can pursue a portfolio of therapies and spread the costs of promotion. This is the *focused specialty niche* approach.
- ◇ Companies adept at customer relationships and brand reinforcement are continuing to set their sights on blockbuster drugs targeting the primary-care segment and on refining their sales and market-

ing approaches to the new challenges in the market. This is the *volume player and sales leader* approach.

- ◇ Some companies, drawn to a low-cost delivery model, could aim to create value not from blockbusters but from marginal or second-tier products that can be developed and commercialized inexpensively. We call this the *low cost and high value* approach.

### The Paths to Value Creation

Using our hypothetical biopharma company, we analyzed the way that the options available to the industry

could play out and what returns they might deliver. In each case, we modeled in detail the shifts in approach and resource allocation that would be needed, among them pursuing efficiencies, changing financial policies, shifting from in-house R&D to licensing, and moving from products oriented toward primary care to those serving specialty therapeutic areas (TAs). We explore each of the strategies in turn below and summarize these findings in Exhibit 2.

Of course, a major biopharma company cannot reinvent its pipeline overnight. Like the proverbial supertanker, it will require considerable time to change direction. One of the virtues of our TSR methodology is

## Exhibit 2. Companies Face Five Strategic Options

	Strategy 1: Optimized base-case approach	Strategy 2: Specialty blockbuster approach	Strategy 3: Focused specialty-niche approach	Strategy 4: Volume player and sales leader approach	Strategy 5: Low-cost and high-value approach
<b>Ten-year TSR (%)</b>	9.0	8.8	9.4	10.9	11.0
<b>Primary drivers of TSR</b>	<ul style="list-style-type: none"> <li>◇ Efficiency improvements</li> <li>◇ Increased dividend</li> <li>◇ Share repurchase program</li> </ul>	<ul style="list-style-type: none"> <li>◇ Return on R&amp;D</li> <li>◇ How quickly the R&amp;D pipeline can be filled</li> </ul>	<ul style="list-style-type: none"> <li>◇ Reduced risk and higher success rates for R&amp;D, given the focus on a therapeutic area</li> </ul>	<ul style="list-style-type: none"> <li>◇ Revenue growth resulting from the expansion of the product life cycle</li> </ul>	<ul style="list-style-type: none"> <li>◇ Margin improvement</li> <li>◇ Realizing revenue early from late-stage licensing</li> </ul>
<b>Major risks</b>	<ul style="list-style-type: none"> <li>◇ Continuous improvements in efficiency might be difficult to achieve</li> </ul>	<ul style="list-style-type: none"> <li>◇ During the initial period of R&amp;D investment, maintaining credibility with investors will be challenging</li> <li>◇ Intense competition and overcrowding could occur in therapeutic areas perceived to be attractive</li> </ul>	<ul style="list-style-type: none"> <li>◇ Few distinct niches are available</li> <li>◇ Disruptive technology might affect the niche</li> </ul>	<ul style="list-style-type: none"> <li>◇ There is likely room in the market for only a few of these players, given the number of blockbusters required by the strategy</li> </ul>	<ul style="list-style-type: none"> <li>◇ Products entering a drug class late might not get approved</li> </ul>

Source: BCG analysis.

that it is attuned precisely to that *gradual* evolution: it shows how investors would value successive small shifts in margin and growth.<sup>3</sup>

**Base Case: Business as Usual.** The base case for our hypothetical biopharma company calls for the CEO and executive team to carry on in the traditional way—pressing ahead with a diversified pipeline and a vertically integrated approach. By pursuing a range of primary-care and specialty TAs, this approach pins a company’s hopes on developing—or in-licensing—a new generation of potential blockbuster drugs. Under this strategy, the blockbusters are needed to recoup the losses that the company will face when its current and highly valuable patents expire.

In our analysis, we calculated that this approach would achieve an annual TSR of little more than 6 percent over the next ten years—a figure below investors’ required rate of return.<sup>4</sup> Not surprisingly, conducting business as usual is an approach that will no longer deliver.

The next approach we analyzed is the optimized version of the base case—striving for lower costs and higher efficiency—and the other four approaches are the new strategies outlined above.

**Strategy 1. Optimized Base-Case Approach: Strive for Efficiency.**

Suppose our hypothetical CEO recognizes the need for change but stops short of a radical transformation, opting instead to tweak rather than replace the entrenched business strategy. In this scenario, we envision the company’s executive team duly making improvements in three broad areas: *operational efficiency* in the

manufacturing, sales force, and other key areas; *R&D productivity*, for example, continuing the trend toward offshoring R&D and tightening decision making to screen out more risky compounds; and *financial policy*, which could include raising dividend

A one-off productivity initiative will not normally be sufficient to rebuild investor confidence.

payouts and repurchasing the company’s shares. As it happens, all of the top-20 biopharma companies are, to some extent, making these kinds of moves.

If our hypothetical company proceeds in this way, how would its TSR prospects change? According to our analysis, they would improve considerably, but not enough. The annual TSR over the ten-year period would amount to 9 percent—and even that would be contingent on maintaining efficiency improvements, as well as maintaining a stream of R&D successes at historical industry-average rates.

In this approach, value creation is driven by both the bottom-line impact of cost savings as well as the improvement in the P/E multiple that results from higher profits. Of course, one proven route to cost savings is through the synergies that are attained by merging with another large player. But whether savings are achieved through mergers or other means, the main risk inherent in this approach is the sustainability of efficiency improvements. A one-off productivity initiative will not

normally be sufficient to rebuild investor confidence. What’s needed is a resolute routemarch of continuous performance improvement. Think Toyota and GE, but in a biopharma context.

**Strategy 2. Specialty Blockbuster Approach: Address High Unmet Need.**

This approach makes intuitive sense: our hypothetical company develops only those drugs for which there is very high demand—and in areas where breakthroughs in treatment outcomes should result in high prices and large market share. It is the strategy underpinning the moves that many companies are making into oncology and other specialty TAs. Typically, such companies believe that they possess specific capabilities or insights into the TAs they are targeting, and they intend to continue to develop new drugs in-house—although they remain open to in-licensing or acquisitions as well.

As this strategy is focused fundamentally on R&D, it requires some time to achieve payback. Our hypothetical company would spend five to ten years refocusing R&D, shifting efforts out of less-advantaged TAs and into those with high unmet need. But the investment would be worth it. The refocus should help translate innovation into value creation, as these specialty markets experience less price pressure and competition from generics than do the primary-care markets.

3. In the Appendix, we detail the levers we have varied in the model to assess the base case and the five strategies.

4. We estimated the long-term return expected by investors, the cost of equity, at approximately 10 percent. In our calculation, we used the long-term historical TSR for the S&P 500, drawing on 80 years of data from Standard & Poor’s Compustat.

The strategy involves a sharp rise in R&D spending, so executives adopting it might be averse to raising dividends. Accordingly, our modeling left dividend levels unchanged from the base case of conducting business as usual, but we included in our model a share repurchase program to distribute excess free cash flow each year.

Despite its evident appeal and despite the enhanced revenue growth that comes from developing high-value drugs for unmet needs, this strategy would produce returns of just 8.8 percent in our analysis—lower than those of Strategy 1, the optimized base case.

The reasons for this are that this strategy's enhanced revenue growth would occur only near the end of the ten-year timeline and that the consequent small rise in value would be offset by the increased spending on R&D in the near term. As a result, this strategy would achieve less improvement in the P/E multiple than would the optimized base case. In this option, the P/E lift would be muted because investors would still be discounting R&D and would not award dividend increases.

Certainly there's no escaping the need to invest now to yield benefits later—but with this strategy, the gap between now and later is a particularly lengthy one.

The potential drawback of this strategy is that of overcrowding in a competitive marketplace. TAs perceived as having high unmet need are likely to attract a great number of companies eager to develop the requisite drugs. Although it is possible that the market—for specific cancer drugs, say—would be large enough to ac-

commodate and reward all of these entrants, it is just as likely that the market would show a winner-take-all tendency and that the majority of competitors—being insufficiently differentiated—would founder.

The value of this strategy lies in the concentrated experience that a company accumulates in its chosen TA.

**Strategy 3. Focused Specialty-Niche Approach: Own a Piece of the Market.** As a variation on targeting high unmet needs, some companies have been sharpening their focus even further and developing a strategy for serving a specific therapeutic niche. In TAs such as ophthalmology, HIV, and diabetes, for example, they have successfully created portfolios of drugs—and sometimes even services beyond the drugs themselves.

The value of this strategy lies in the concentrated experience that a company accumulates in its chosen TA: such experience can translate into a reduced risk of failure in R&D, and it can also create barriers for would-be entrants into the TA, thereby preempting potential competitors.

Companies adopting this strategy would home in on a tightly defined subset of TAs. In addition, they would look to source an increasing share—if not a majority—of their innovation from outside their walls. The intent here is for the company to make itself the unquestionable partner of choice for anyone seeking to develop a product in its niche.

Focusing on a niche can offer an attractive return. Our modeling showed that this strategy would yield a ten-year TSR of 9.4 percent—higher than that delivered by either the optimized base case or the strategy of pursuing specialty blockbusters. One of the key drivers of value in this strategy is reasonable market growth. Yet since niche markets tend to be relatively smaller, this growth would actually be lower than that achieved by serving high unmet need through blockbusters. Another key driver is the improved margin secured at an attractive P/E multiple; it is achieved because investors are impressed by the strategy's combination of efficiency, focused R&D, and more generous dividend policy.

The strategy suffers from a couple of weaknesses, however. First, a niche strategy would deliver less of an impact for a large company than for a small one. Certainly, large companies could boost their returns by including within their broader strategy an attempted expansion into various niches.

An example of this approach is Novartis acquiring a stake in Alcon. Second, companies focusing on a specialty niche might encounter overcrowding in the market, just as they would when pursuing specialty blockbusters. One example of such heightened competition is the large share of R&D efforts under way for antiviral and HIV medications.

**Strategy 4. Volume Player and Sales Leader Approach: Win in the Mass Market.** Facing the grim prospect of confronting both the patent cliff and increasing payer pressure at once, many companies have turned away from primary-care markets to

seek their fortune in specialty and niche areas. Yet there is still substantial unmet need in primary care, notably for the so-called epidemics of diabetes, obesity, and Alzheimer's disease. The challenge—and opportunity—in the mass market is to reinvent the blockbuster concept for the twenty-first century.

The key will be twofold. First, companies pursuing this strategy will need to build new capabilities to establish strong relationships with payers worldwide and thus secure preferred access to the market. Second, they will need to find ways to persuade patients and physicians that these new therapies are somehow distinctly preferable to the many existing generic alternatives—while they also redefine and make more efficient the selling model for primary-care products.

Winning in the mass market requires relatively less internal innovation in R&D than does focusing on speciality blockbusters or niches. A company adopting this strategy could even source all of its molecules from elsewhere, so long as it retains expertise in managing late-stage development and commercialization, thereby ensuring that each new product gets reimbursed by payers and is utilized to its full potential.

Achieving a product's full potential would include managing its life cycle so that value is captured throughout all the stages of product life and in markets beyond the traditional, so-called developed markets of the United States and Europe.

This strategy would shift R&D resources away from discovery and

into aggressive in-licensing, post-approval market development, and life cycle management. Unlike the strategies targeting specialty blockbusters and focused speciality niches, this approach would cover a broad range of TAs, but the company's

The challenge—and opportunity—in the mass market is to reinvent the blockbuster concept for the twenty-first century.

emphasis on R&D would be mostly downstream—that is, it would invest in less R and more D.

This type of mass-market strategy holds out the promise of superior returns. According to our modeling, it would deliver a ten-year TSR of 10.9 percent—significantly higher than the TSR delivered by the other options we have discussed so far.

The primary drivers of this superior TSR are enhanced revenue growth—thanks to numerous gains secured through conscientious life-cycle management—and improved margin, achieved through lower spending on R&D, since all the years of in-house R&D would be exchanged for up-front milestones and back-end royalties.

Note that the impressive return of 10.9 percent would be achieved even though this option would maintain a higher level of spending in sales and marketing than that in any of the other strategies. For those few biopharma companies that have the global scale and capabilities to win in primary care, this option could represent the most attractive choice.

### Strategy 5. Low-Cost and High-Value Approach: Redefine the Cost to Compete in Primary Care.

The final strategy we evaluated is markedly different from the others. In this approach, competitive advantage is derived less from product innovation than from innovations in how the market is served, with a particular focus on the costs involved.

Think of this option as the Southwest Airlines approach for the biopharma industry. In a primary-care environment, the challenge is to bring to market products that aren't billion-dollar blockbusters—that is, products that will yield typically \$500 million or less in annual sales—while at the same time preserving or even enhancing margins; and the trick is to use a radically different cost structure to do so. For our hypothetical company, for instance, we restructured costs by aggressively reducing R&D spending, relying on in-licensing, and accepting that far fewer products would become blockbusters.

This option is fairly similar to the one used by generics companies, especially by those active in the so-called branded-generics market that operates in some parts of the world. True, there is still some room for product innovation under this approach, but such innovation tends to take the form not of scientific breakthroughs but of changes that make a product easier to use, and hence likelier to sell.

Consequently, companies that pursue this option will still need to spend some of their funds on R&D, and they will still need to differentiate their products, but their real winning advantage will be their ability

to manufacture and market their products far more cheaply than the innovators can.

When we tested this approach with our financial modeling, it emerged with a TSR of 11.0 percent, well above that of the optimized base case. Its key drivers of value creation are the rapid growth of revenue generated by late-stage in-licensing (even from smaller assets) and the lowest cost base of all the strategies we tested. Another useful contributor to value creation is the aggressive dividend policy that companies using this strategy would likely adopt, ensuring that earnings are returned to shareholders.

For those companies that can radically reengineer their cost base—and that are prepared to relinquish the traditional emphasis on blockbuster innovations—this alternative strategy could prove the best way forward.

## A Cumulative Effect

If enough companies play to their strengths and implement optimal strategies, the individual benefits could be compounded by an overall upswing in the industry as well—a gain that would add a bonus percentage point or two to the TSRs of biopharma companies. This promising scenario is grounded in a relatively well-established hypothesis: specialization will not only sharpen competition but also encourage collaboration. The industry's ecosystem could evolve in a coordinated fashion, with companies occupying differentiated and complementary ecological spheres.

The four alternative strategies we examined in this Focus, Strategies 2

through 5, allow for creative interplay. If a company pursuing one strategy collaborates with a company pursuing another, duplication between companies would be minimized and new entrants that bring new capabilities would be welcomed

Specialization in the biopharma industry will not only sharpen competition but also encourage collaboration.

as partners rather than feared as competitors. A system of this kind already seems to be developing. For instance, Bristol-Myers Squibb, which is moving toward pursuing specialty blockbusters, is already partnering its primary-care assets with other companies: witness its collaboration with AstraZeneca in commercializing the recently approved diabetes therapy Onglyza (saxagliptin).

The trend toward differentiation and collaboration could help to stem the proliferation of me-too drugs, reduce R&D overcapacity, and create a more transparent and functional market for trading assets. In our modeling, the more broad-based strategies—such as pursuing specialty blockbusters or operating as a volume player and sales leader—stand to benefit most from any network of collaborations that emerges.

In any ecosystem, the species that prosper during times of major environmental change are those that adapt appropriately. Those that fail to make the right adaptations may live on, but their existence will

be uncomfortable and increasingly in danger of extinction.

Biopharma companies have already begun to respond to the changes in their environment. Most of the leading companies are shifting toward one of the alternative approaches we have discussed. They have realized that merely optimizing their current business model by reducing costs and increasing R&D productivity is a basic survival technique but not a serious tonic—and certainly not a guaranteed path back to attractive TSR performance levels.

Rigorous analysis of potential value creation is particularly useful as a yardstick for judging the various strategic decisions that companies might take. The TSR method is unrivaled when it comes to making the crucial apples-to-oranges comparison between investment in marketing and sales for near-term revenues and investment in R&D for long-term growth. By factoring in not just revenue and earnings growth but also investor sentiment and financial yield, the TSR methodology ensures that management looks at strategic choices in much the same way that investors will.

If individual biopharma companies engage in some earnest self-scrutiny and redefine their identity—or rather, find their true identity—they can make the strategic adaptations that the environment requires. Such adaptations will enable them not only to weather the industry's environmental changes, but also to thrive in them—and even to reinvigorate and enrich the industry as a whole.

# Appendix

## BCG's Methodology for Modeling TSR

Total shareholder return (TSR) is a widely used measure of corporate performance because it is more illuminating than simple share-price appreciation on its own. TSR is calculated by combining share price appreciation with dividend yield. Share price appreciation in turn is a function of both the intrinsic value generated by the company (its profits and profit growth), and the

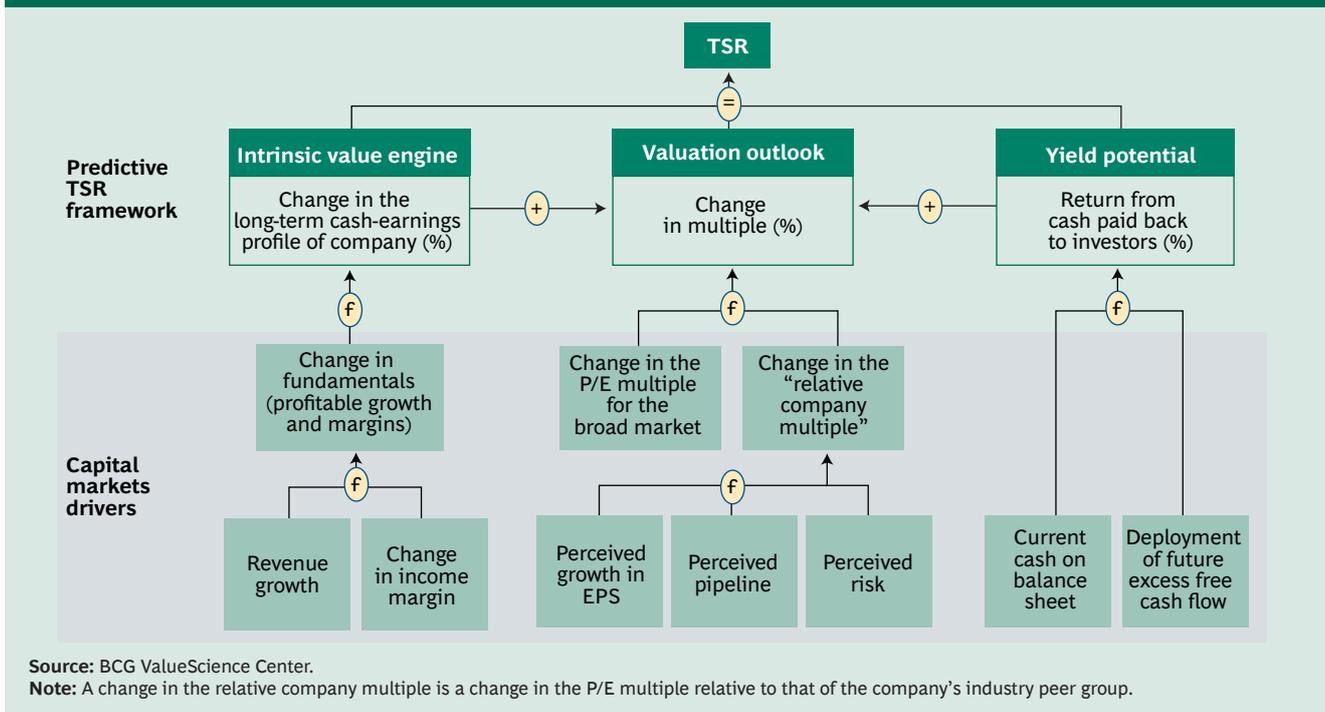
way that investors value these profits, commonly represented by a stock's P/E ratio. In practice, all the factors interact. (See Exhibit 1.)

To predict future TSR, The Boston Consulting Group has developed an empirical regression model that identifies the relationships or factors that drive a company's P/E multiple and thus its valuation outlook.

(See Exhibit 2.) The relevant factors vary by industry; for biopharma, they are the following:

- ◇ Projected three-to-five-year growth in earnings per share (EPS).
- ◇ Gross margin.
- ◇ Patent-protected revenue. (This is the time-weighted sum of all fu-

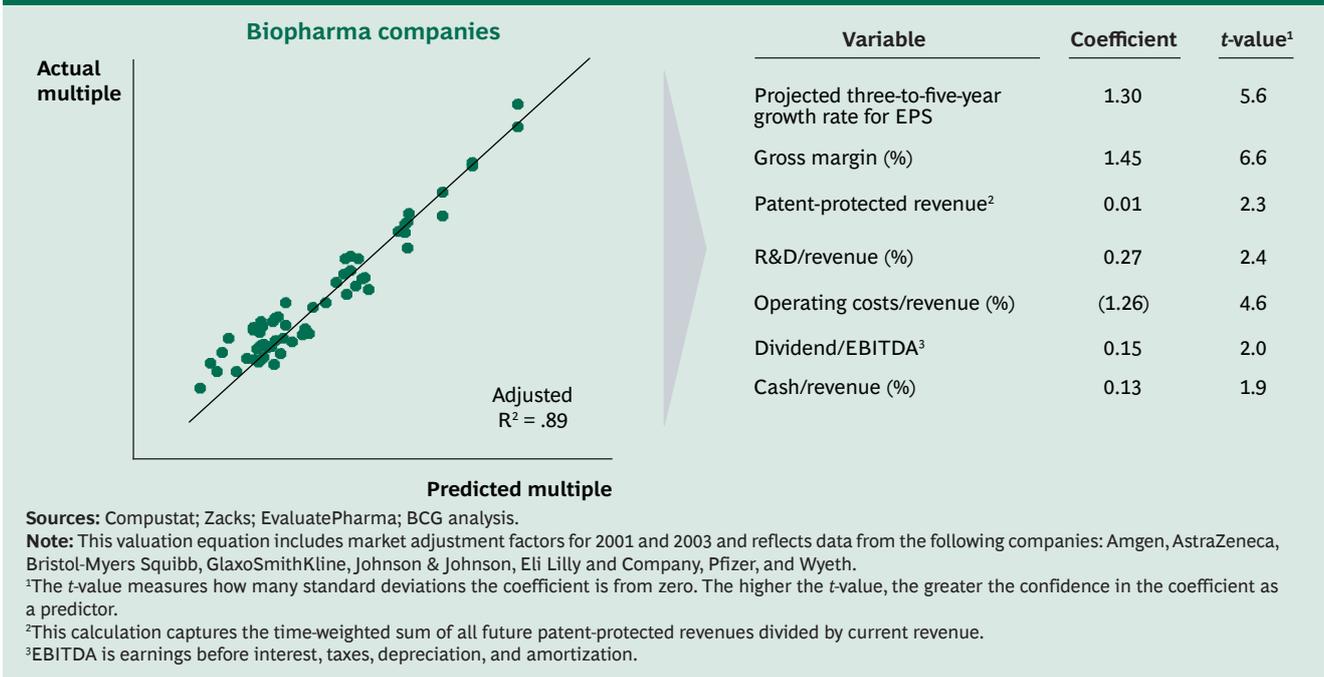
**Exhibit 1. Many Factors Drive TSR**



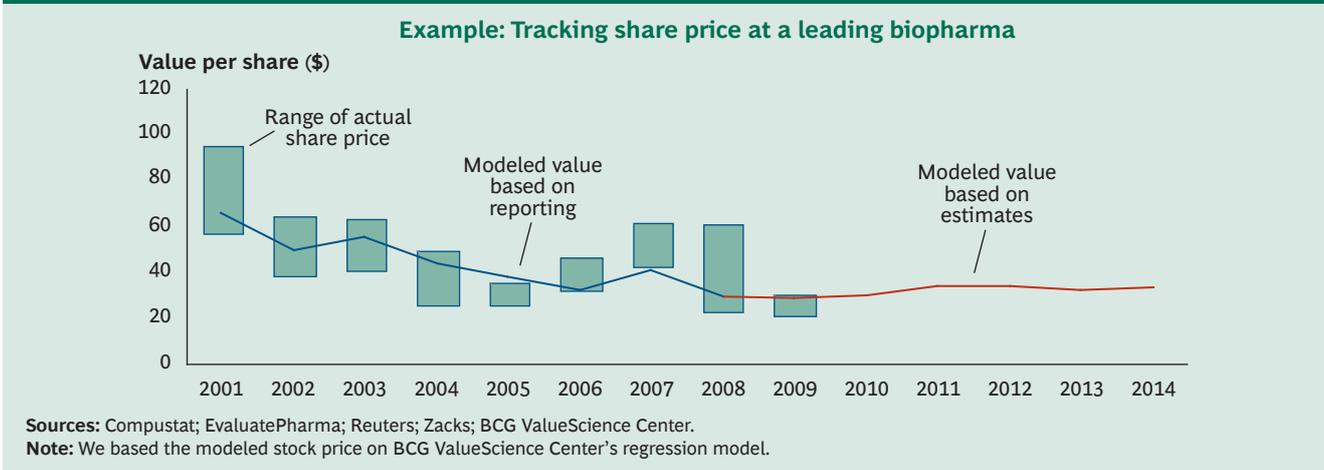
- ◊ R&D spending. (In the case of TSR, higher is better, to a point.)
  - ◊ Operating costs. (Lower is better.)
  - ◊ Dividends.
  - ◊ Cash.
- BCG's regression model is highly predictive of stock valuations of individual companies. Exhibit 3 illustrates

how well our model tracked the share price of one biopharma company—and how the model can be used to estimate future share-price levels. The model's prediction in this case is based on consensus analysts' forecasts for the next several years.

## Exhibit 2. BCG's Regression Model Predicts a Company's Valuation Outlook



## Exhibit 3. Our Regression Model Closely Tracks Share Prices



To make the assessment underlying this report, we used BCG’s proprietary empirical regression model to predict future TSR for a prototypical large biopharma company. We created a hypothetical biopharma company and built its detailed profit-and-loss (P&L) statement and balance sheet, projecting 20 years into the future.

We constructed the P&L for the hypothetical biopharma company by taking a bottom-up view based on revenue forecasts for individual products, including products still in the company’s pipeline (appropriately adjusted for risk, of course). We also differentiated the breakdown of the company’s revenue by source—such as from the current pipeline, in-licensing, follow-on products, or other sources.

Our assumptions for the base case were built around a top-15 biopharma facing slowing growth and an earnings cliff in 2013, pursuing a diverse portfolio (containing both biotech products and small molecules), and following conservative financial policies. The challenge then was deciding how to modify this base case to reflect the effect of the different strategies we wished to evaluate.

It would have been easy to simply assert that the hypothetical company would revise its pipeline—or shift to a lower cost structure. Modeling such a move, however, would not have reflected the reality of how long it takes to effect efficiency improvements or reshape a pipeline.

Instead, we gradually introduced a broad range of changes across many

key performance metrics into the P&L and product portfolio and pipeline for the base case, and then we assessed how these incremental changes would drive the detailed economics of each option.

To account for investors’ propensity to value near-term results, we used a ten-year TSR to ensure that every strategy was afforded enough time to achieve its full impact. (For a sample of the levers we varied in the model, see Exhibit 4. For an example of the granularity in our model and output, see Exhibit 5.)

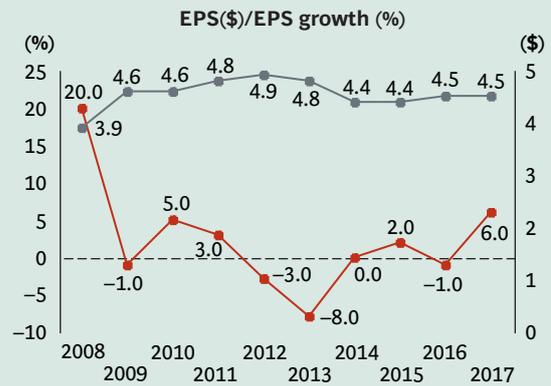
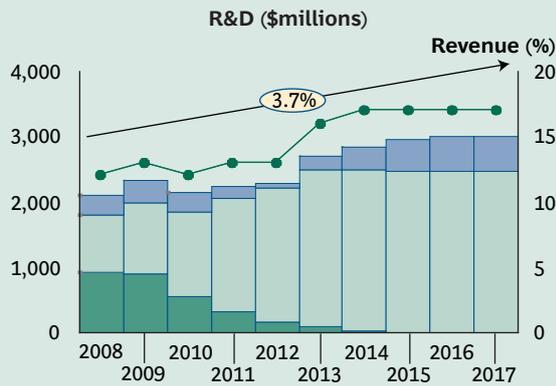
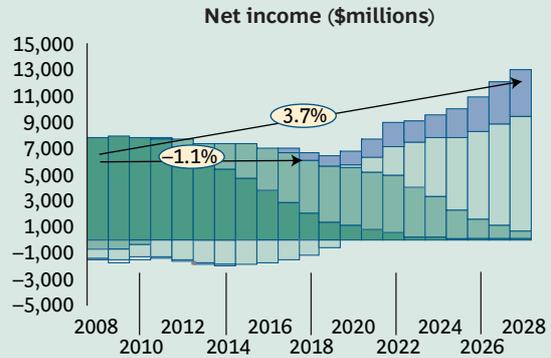
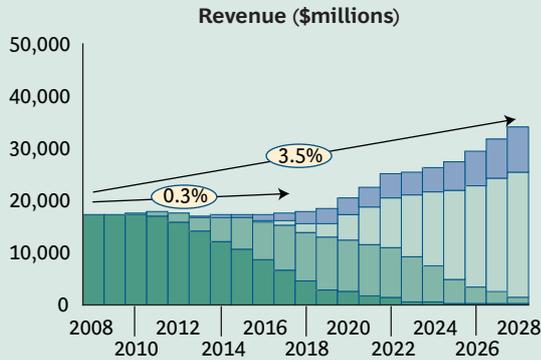
#### Exhibit 4. We Relied on Detailed Assumptions to Calculate P&L for Each Strategy

	Base case	Strategy 1: Optimized base-case approach	Strategy 2: Specialty blockbuster approach	Strategy 3: Focused specialty-niche approach	Strategy 4: Volume player and sales leader approach	Strategy 5: Low-cost and high-value approach
CAGR for revenue, 2008–2018 (%)	0.2	0.3	0.8	0.7	2.8	1.8
Probability of technical and regulatory success (PTRS) for portfolio mix (%)						
Small-molecule portfolio	10	10	10	12	10	10
Biotech portfolio	16	16	16	16	NA	NA
R&D spending (% of revenue)	17	17	16	16	13	15
Cost of goods sold (COGS) for small-molecule portfolio (% of revenue)	20	18	18	18	18	15
COGS for biotech portfolio (% of revenue)	30	27	27	27	NA	NA
Marketing and sales spending range (% of revenue)	13–20	12–18	11–15	10–15	12–23	10–15
General and administrative (G&A) expense (% of revenue)	5.0	4.5	4.5	4.5	4.5	3.0
Dividend payout ratio (%)	40	60	40	60	60	100
Share repurchase plan (shares per year)	None	15 million	15 million	15 million	15 million	15 million
Value of cash	60%	75%	◇ 75% for first year ◇ down 5% for 2 years ◇ up 5% annually to 100%	◇ 75% for first year ◇ up 5% annually to 100%	◇ 75% for first year ◇ up 5% annually to 100%	◇ 75% for first year ◇ up 5% annually to 100%

**Source:** BCG analysis.  
**Note:** NA denotes data are not applicable.

## Exhibit 5. We Projected the Impact of Each Strategy on Business Fundamentals

### Example: Strategy 1, Optimized base-case approach



■ Inline products  
 ■ Pipeline  
 ■ Internal discovery  
 ■ Follow-on products  
 ■ Licensing  
○ Compound annual growth rate (CAGR) for the period  
— R&D as a percentage of revenue  
 — EPS  
 — EPS growth

Source: BCG analysis.



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