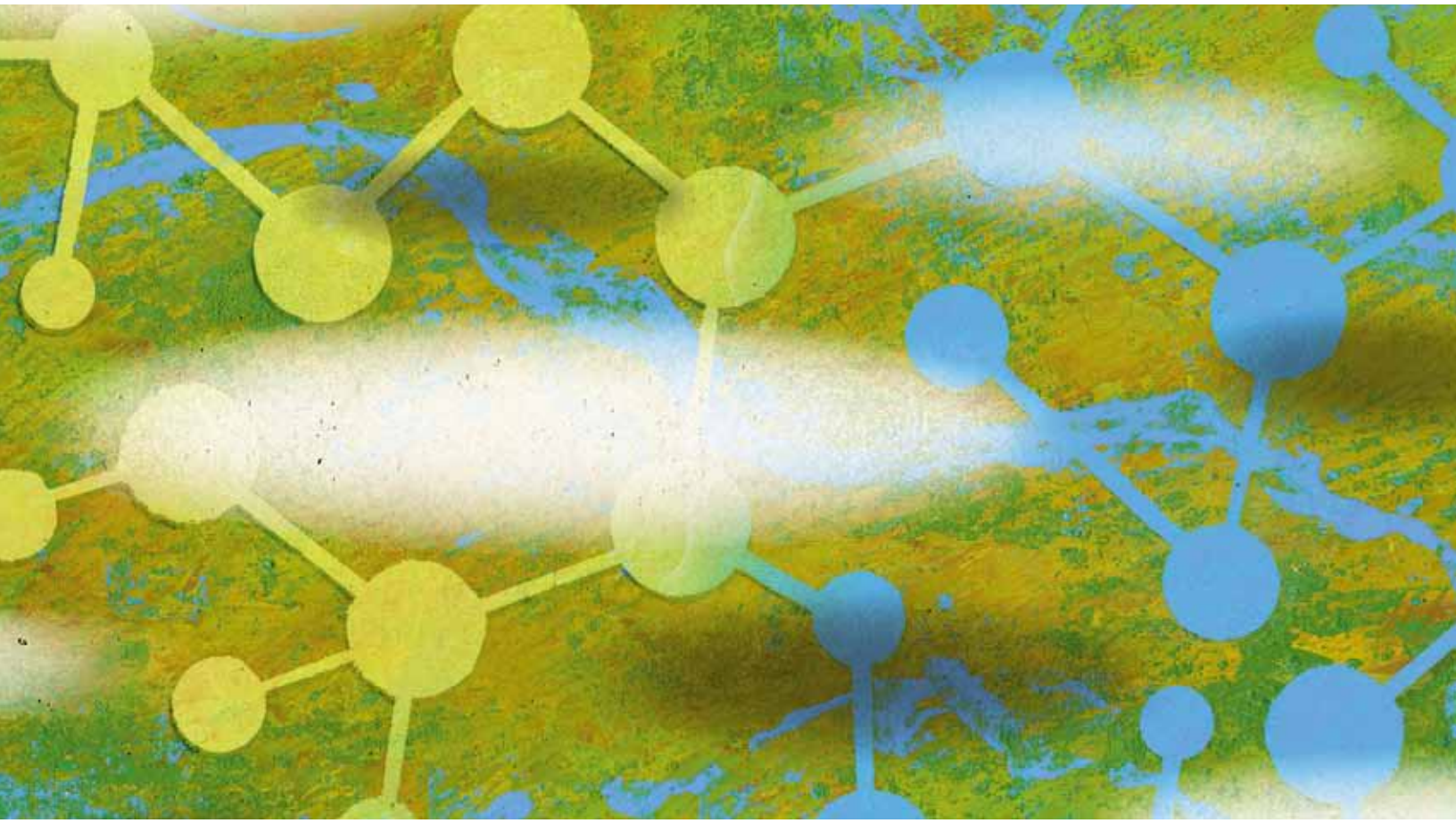
McKinsey on Chemicals

Number 3,
Winter 2011



McKinsey on Chemicals is written by consultants in McKinsey's global chemicals practice together with other McKinsey colleagues.

This publication offers readers insights into value-creating strategies and how to translate these strategies into company performance.

To send comments, request copies, or to request permission to republish an article, send an e-mail to McKinsey_on_Chemicals@McKinsey.com.

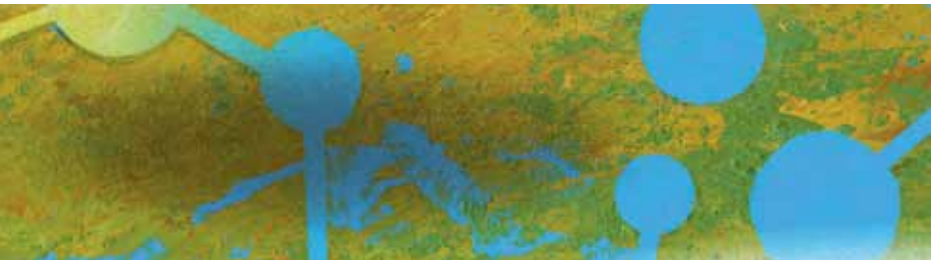
McKinsey on Chemicals
Number 3, Winter 2011






Introduction

**Florian Budde,
Tomas Koch,
and John Warner**



Welcome to the third issue of *McKinsey on Chemicals*

Over the past year, the worldwide chemical industry has seen a rebound that has surpassed its most optimistic expectations. Demand remained strong in the major emerging markets, boosting the growing chemical industries in those countries as well as generating export demand for established chemical production centers in Europe, North America, and Japan. But demand has also proved more resilient in the developed world than had been feared in the darkest days of early 2009. US producers in particular have confounded doomsayers and ridden the shale-gas boom that has brought a low-price ethylene feedstock bonanza.

Nevertheless, the crisis has certainly affected the industry significantly. As our first article shows, it has accelerated shifts in the global industry's long-term makeup. "Chemicals' changing competitive landscape" shows how high energy prices and the global economy's eastward shift are aiding the rise of new chemical industry leaders, companies playing to different rules than the incumbents that have led the industry for the last several decades. While the incumbents have focused on classic shareholder value, the newcomers are more focused on resource monetization and economic development. If each type of company is to thrive, the newcomers need to build capabilities in management, innovation, and marketing performance to capture their full potential, and incumbents must adapt their strategies and priorities to this new landscape.

Our second article takes another longer-term perspective on the industry, in this case that of the capital markets. Our analysis of the period from 1994 to 2009 shows that the chemical industry has been a strong performer, outpacing most of its major customer industries in recent years. As "A capital-markets perspective on chemical-industry performance" explains, the analysis contradicts one element of conventional wisdom by showing that there is no empirical basis for the commonly held view that capital markets favor less cyclical specialty-chemical companies over commodity or diversified companies. Instead, the data show that capital markets base their valuations overwhelmingly on past operating performance, regardless of company type. We also analyzed the capital-markets performance of a sample of companies through the crisis, an exercise that showed that markets rewarded companies that

took rigorous action—again underlining the market's focus on operating performance.

Proceeding from the general to the particular, our next two articles address themes that are consistently high on the priority list for senior chemical-industry management—innovation and energy. Innovation remains a major area of opportunity for chemical companies, and one of the most successful practitioners of innovation in the chemical industry is Dow Corning, though it is not necessarily among the best recognized as such because the company is privately held. We sat down with Dow Corning CEO Stephanie Burns and Gregg Zank, its chief technology officer, to talk about their approach to both new-product innovation and business-model innovation—an area in which Dow Corning's Xiameter brand has been a trailblazer.

Climate change has dropped down many CEOs' agendas in the year since the Copenhagen conference, and with it the urgency to reduce energy consumption and in that way reduce carbon dioxide emissions. However, energy prices remain at high levels, and energy savings continue to present an important area that is worthy of focus. In "Capturing the lean energy opportunity in chemical manufacturing," we describe a new approach to improve energy efficiency based on an adaptation and translation of lean principles to the area of energy consumption.

Our last two articles focus on marketing and sales topics. With the chemical industry in recovery mode and enjoying a volume and margin rebound, marketing and sales is a particular concern for senior management. "Improving pricing and sales execution in chemicals" describes an approach that enables companies to achieve greater transparency on product and account profitability and sales-force actions; companies adopting the approach have improved their return-on-sales performance, in some cases substantially. The second article, "Kick-starting organic growth," describes how to apply a more granular lens to discovering new market prospects—micromarkets—and explains how chemical companies can then move to capture these opportunities.

In this and future issues of *McKinsey on Chemicals*, we will bring you the best of our thinking in the field. We trust that you will find the publication thought provoking, and we welcome your feedback and suggestions for topics to cover in addition to those we are already working on. Please write to us at McKinsey_on_Chemicals@McKinsey.com.

Florian Budde (Florian_Budde@McKinsey.com) is a director in McKinsey's Frankfurt office, global chair of the chemicals practice, and leader of its Europe, Middle East, and Africa chemicals practice. **Tomas Koch** (Tomas_Koch@McKinsey.com) is a director in the Seoul office and leader of the Asia chemicals practice. **John Warner** (John_Warner@McKinsey.com) is a director in the Cleveland office and leader of the Americas chemicals practice.

Chemicals' changing competitive landscape

High energy prices and the global economy's eastward shift are creating new chemical-industry leaders who play by different rules. Newcomers must build capabilities to sustain their success, while incumbents must sharpen their value propositions to compete.

Florian Budde

A major shift in the competitive landscape of the worldwide chemical industry is under way as new players from oil- and gas-producing countries and the high-growth developing markets of China and India join the industry's top ranks in sales. The new players focus on resource monetization and economic development, in contrast to the classic shareholder value-creating goals that have historically informed the strategies of top players.

Not only are these newcomers playing by different rules, but they are also better placed to benefit from two of the key dynamics driving the industry's future: control of advantaged feedstocks in a high-oil-price world, and privileged access to the most attractive consumer-growth markets.

While newcomers may be better placed than incumbent chemical companies in Europe, North America, and Japan, the shift creates challenges for both groups. If the newcomers want to establish themselves as industry leaders in the coming decades and fully realize the industry's wealth-creating and society-supporting potential, they must evolve rapidly. They should move beyond simply monetizing their cost- and market-advantaged positions to build capabilities that will put them on more equal footing with incumbents when it comes to management, innovation,

and marketing performance. At the same time, to assure continuing success in this new landscape, incumbents must reconsider their position in the industry and adapt their strategies and priorities accordingly. Newcomers and incumbents that can take these steps will be well positioned to ride the global chemical industry's continuing profitable growth trajectory.

A changed industry

Coming out of the financial crisis and economic slowdown of the past two years, the global chemical industry is seeing major changes. The first relates to energy-price dynamics. The chemical industry is confronting unprecedented hydrocarbon price volatility. In addition, energy prices are significantly higher than they have been for the past two decades—and they are higher than they were coming out of previous recessions. While there is little progress on climate-change regulation, which could add carbon tax–related costs for chemical companies in certain regions, the industry is nevertheless seeing increasingly pronounced divergences in gas and electric power prices among regions. Overall, the degrees of cost advantage and disadvantage among regions have increased.

Second, the economic downturn has highlighted the accelerating shift in the growth of global chemical demand from developed economies to the developing world. While demand in Europe and the United States has not returned to pre-crisis levels and seems unlikely to do so until 2012, China's chemical demand increased by 6.4 percent in 2009 and by over 15 percent in 2010. Meanwhile, new petrochemical capacity in the Middle East continues to expand, while plant-closure announcements have multiplied in Europe, Japan, and the United States.

Closely related to this is the third major change—the arrival among the chemical industry's leadership ranks of companies based in hydrocarbons-producing countries and in large, high-growth developing markets such as China and India. The simpler value propositions of the new players are in some ways on a collision course with the value propositions of the traditional players, and the disruptive potential of this development is only gradually coming into view.

The industry's leading incumbents have operated for the past two decades with similar goals: striving to increase shareholder value based on their technology portfolio and asset base, and making opportunistic excursions from traditional home markets to tap emerging-market growth. Whether the companies were based in Europe, North America, Japan, or South Korea has only added nuance to this common approach.

In contrast, for governments and their production subsidiaries from hydrocarbons-rich countries, chemical manufacturing represents an opportunity to monetize advantaged feedstock resources and build industries that will provide jobs for their rapidly expanding populations—even if it will have a detrimental effect on industry structure and profitability.

For leading companies based in fast-growing major emerging markets, chemical production is seen as a necessity to provide the products needed for continued economic expansion. Lower labor costs in these countries translate into competitive capital-investment and operating costs for these companies, many of which are owned by the state or by families that have close ties to the government. These companies can establish

Building a worldwide market presence will require that newcomers take steps to establish international operations and build up the management skills to run those operations successfully

production to capture local market growth, and they are little concerned about any resulting global supply-demand imbalances for the chemicals in question.

Importantly, both groups of newcomers include many government-backed companies. As a result, these companies can invest on a scale that is much greater than even the largest traditional chemical-industry players.

These changes have been building for years, but their importance is hard to overstate. In summary, incumbents that have ridden growth in developed and developing markets are now undercut by powerful new rivals with access to cheap feedstocks and the most attractive growth markets.

The new competitive dynamics pose important questions for both newcomers and incumbents about the steps they must take to assure their continued success. For the newcomers, the choices are arguably more straightforward than for the incumbents, which have large legacy businesses to reposition.

Newcomers must develop world-class capabilities

For new producers—whether based in feedstock-rich countries or high-growth emerging-market countries with low labor costs—market entry has been built on production, taking advantage of their lower cost base to establish a presence based on price in their export markets. This is a logical approach and a natural entry point. But it tends to result in the commoditization of the market and a strict focus on the lowest price, and it therefore risks destroying a lot of the value that exists in the market for the new entrants as well as for existing players.

There have been numerous examples of competition from new low-cost producers that has reduced prices well below the level that would assure them a foothold in developed markets, in products as varied as polyethylene terephthalate and fluorochemicals. Similarly, Chinese specialty-chemical products are often sold in developed markets in North America and Europe on a specification basis through third parties, which means that the Chinese producers are cut off from customers and have limited insights into market dynamics.

As new players build their presence in the industry, they must develop capabilities to sustain their growth and look more ambitiously at the kind of profile they want to create. As a first step, they must establish their own R&D and innovation capabilities, which will enable them to offer differentiated products and make them less dependent on incumbents for technology.

Second, new producers must start to build marketing capabilities that will enable them to move beyond selling simply on low price and reap the full economic benefits from their products. They must develop expertise in approaches such as differentiated marketing, transactional pricing and value pricing, and sales-force management. This is a need shared by all new producers, whether they are manufacturing for export or meeting surging demand in home markets.

Developing these capabilities will help new producers get better returns from their current product range and avoid leaving money on the table from selling at unnecessarily low prices. Doing so will become even more pressing as new producers expand their portfolios to include more sophisticated and higher-value-added products, from which they will want to extract maximum value.

Becoming worldwide suppliers will require new producers to establish marketing and sales capabilities in developed markets that are sophisticated enough to support this type of product. Many of these products will require a completely different type of sales approach—one that is capable of dealing with product-approval registrations, gaining intimacy with customers' product-development programs, and getting products specified for these programs.

Third, all of the above moves related to building a worldwide market presence will require that newcomers take steps to establish international operations and—most important—build up the management skills to run those operations successfully. Whether such operations are established through acquisitions or built from scratch, creating and running subsidiaries in overseas locations will be a new challenge for these players' senior-management teams.

Incumbents must reappraise their opportunities and adapt

Established producers in Europe, Japan, South Korea, and to an extent North America will have to take steps to adapt to lower overall demand-growth rates for chemicals in their home markets. Clearly, there are segments of the industry in mature, developed markets that continue to enjoy good prospects and that are relatively safe in the new competitive landscape. These divide into two main areas, upmarket and down-market, where there will be niches that are relatively impregnable.

The first area is chemical-industry segments in markets that require customer intimacy and a high level of service support. Examples include flavors-and-fragrances companies that have developed superior customer insights and exclusive manufacturing know-how to support customer demands; coating companies that manage the painting of automobiles within the production line; leather chemicals, where the producer works closely with luxury-goods makers; and water-treatment and construction chemicals. In all these cases, customer intimacy makes them less vulnerable to inroads from low-cost offshore competitors. The second area is a group of basic chemicals where the low prices mean that importation is not viable; this includes such products as sulfuric acid, hydrogen peroxide, industrial gases, and, to an extent, caustic soda. These are, and will continue to be, regional markets.

Where incumbents must look especially carefully is at the many market segments between the two poles. In many of these segments, lower

demand growth is likely to translate into the consolidation of players in certain sectors and capacity closures. Producers in Europe, North America, Japan, and South Korea have historically been net exporters of chemicals, but for many product areas, their export cost position will become less and less competitive. They already face cost disadvantages on raw materials and must confront disadvantages on two other scores: incumbents' domestic plants are not only in the wrong place to serve emerging growth markets such as China, but they also tend to be older installations that have intrinsically higher costs than the new world-scale production capacity that is being installed in the new growth markets.

Successfully managing the transition to this lower-growth mode will require that incumbents evaluate their product portfolios and manufacturing footprints. They must also decide in which sectors they want to be consolidators, with an eye to becoming the "last man standing," and in which sectors it would make more sense for them to be among the companies being consolidated.

Companies must bear in mind that as the industry landscape shifts, the relative attractiveness of products will change, with some more vulnerable to the trends in the industry than others. They must look at their portfolios accordingly. Established markets are becoming net importers of a growing range of chemicals, as new feedstock-advantaged producers can profitably serve these markets. While imports frequently lead to lower prices and reduced margins in the short term, this is not always the case in the long run, particularly if incumbents are willing to shut part of their capacity. Imports are rarely able to cover all domestic demand volumes, and for the surviving incumbents that can manufacture domestically at below the cost of imports, this evolution can be positive if it results in a more clearly structured and disciplined market with pricing based on import-price parity.

It is also important to emphasize that across all of their businesses, incumbents must work hard for functional excellence with regard to low-cost operations and lean and effective marketing and sales. In the face of the growing competition from newcomers, incumbents cannot afford any slack in their businesses and must make sure they are top-class operators in all areas.

Riding the new market-growth waves

Next, incumbent companies must look beyond their home markets and consider how they can ride the dynamics that are transforming the industry—the rise of chemical production in feedstock-advantaged countries and the shift in demand growth to emerging markets. Incumbents must ask themselves how they can join up with the new players, whether by establishing a presence in a resource-rich country or by building capacity in China and other high-growth markets—or by doing both.

They must then consider what they can do to enhance and maintain their attractiveness as a partner. Many incumbents operate broad portfolios of businesses; these companies must think about how they can clarify and best articulate the value proposition that they bring to their potential partners. High on any list will be innovation—creating new technologies and products—which has always been a route to profitable growth in the chemical industry and remains an area of strength for incumbent

chemical companies. Companies that have technology that is needed by oil-producing countries to use in their new petrochemical plants will be best placed in any contest to participate in joint ventures. And companies with know-how that is much in demand in rapidly growing emerging markets will be of greater interest to those countries' governments; they are thus better placed to gain access to such markets.

Incumbents must also think about how the market access that they could provide in their home market could be valuable to new producers. They should consider the best way to make this available. One possibility is to act as a joint-venture partner with a new producer in a way that would enable the incumbent to gradually ramp down its own production.

Finally, incumbents must recognize the strategic choices that they face. What kind of bargaining chips does the company have, and what types of chips might it want to develop? Is it strong enough to stay independent? Should it consider partnerships or alliances? Does a focus on the Middle East make more sense than a focus on China? And if a company decides to focus on China, should it try to ally with a Chinese player or to establish a greater direct presence in China? Companies must think carefully about how to play their bargaining chips for maximum value creation—these chips cannot be used multiple times.

The global chemical industry has entered a new phase in its evolution, as players from oil-producing countries and high-growth developing markets take their places among the industry's leaders. These new players are focused on resource monetization and economic development—and job creation in particular, in a number of countries—rather than on traditional shareholder value, and they thus play by a different set of rules than do the industry's traditional leaders. As a result, the competitive landscape is changing. Incumbents must recognize the shift under way and adapt, while newcomers should build new capabilities to more fully deploy their strengths in the market.

As the world economy picks up speed after the crisis, senior managers are understandably preoccupied with navigating back to "business as usual." However, the shifts in the chemical-industry landscape we have described above have arguably been accelerated by the crisis, as the major emerging economies have recovered faster than the developed ones. As a consequence, the window of opportunity for incumbents to engage with newcomers could close sooner than they might expect. The number of exceptionally resource-advantaged countries is finite, and major emerging markets such as China may pursue a policy of favoring domestic champions. Incumbents should use any momentum gained from recovery in their traditional businesses to advance their positions in the new industry landscape.

Florian Budde (Florian_Budde@McKinsey.com) is a director in McKinsey's Frankfurt office, global chair of the chemicals practice, and leader of its Europe, Middle East, and Africa chemicals practice.

A capital-markets perspective on chemical-industry performance

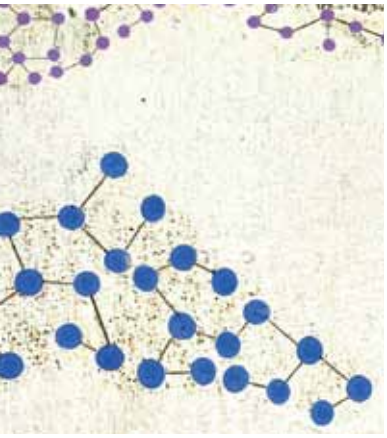
Long-term analysis shows that capital markets base their valuations of chemical companies above all on past operating performance. It also shows there is no basis for the commonly held belief that investors prefer noncyclical specialty stocks.

Florian Budde, Geert Gyselinck, and Christoph Schmitz

The long-running debate continues within the chemical industry over which strategies offer the road to the best shareholder returns. Much senior-management time has been taken up deciding whether to focus on a specialty, commodity, or diversified portfolio and whether to take the business closer to the customer, move upstream, or many other plays; a number of leading chemical players have recently made M&A moves to bolster their specialty profiles.

But what is the verdict of the capital markets, the arbiter of value creation, on these questions? Since capital-markets performance provides the ultimate test of shareholder value creation, we compiled 16 years of financial and stock-market data from 1994 to 2009 for more than 100 chemical companies worldwide, accounting for approximately 70 percent of the total global chemical-industry market capitalization.[1] This has enabled us to review the performance of individual companies (with figures adjusted where necessary to make comparisons possible) and the different chemical sectors, as well as the performance of the chemical industry relative to other sectors.

The analyses show that capital markets do not regard chemical companies' sector affiliation—specialty or commodity—as an indicator for superior or inferior performance. What does stand out is that capital markets are above all



focused on return-on-invested-capital (ROIC) performance and its development over time, and they base valuations on this performance rather than on expectations of growth—a dimension where the markets are seeing little differentiation between companies. Consistent across the period is that capital markets remain sensitively attuned to individual companies' performance trajectories. This was demonstrated dramatically during the crisis when, as the sidebar on p. 18 shows, companies that took aggressive steps to cope saw their valuations rebound more quickly than those of more passive competitors.

Capital markets see chemicals as a strong performer

The long-term data show that the often-held perception of the chemical industry as sluggish and unattractive is largely unjustified. From a capital-markets perspective, the chemicals sector is a strong performer: shareholder returns for chemicals have performed in line with global markets over most of the past 16 years, and outperformed the market average since 2004. The exception is the period around 2000, when the dot-com bubble inflated technology stocks and the overall market.

The fertilizer sector has performed particularly strongly on total return to shareholders (TRS) since 2006. While overall chemicals, excluding fertilizer, showed a compound annual growth rate of 5.8 percent per year between 2006 and 2010, fertilizer achieved 39.1 percent. This has put fertilizer companies among the highest-valued chemical companies.

Not only have chemicals outperformed the market in recent years, they have outperformed many of their major downstream customer industries, such as automotive, consumer goods, and construction, with electronics the only major customer segment to do better. This capital-markets performance suggests that the chemical industry on aggregate occupies a desirable point in the value chains in which it participates, which enables it to capture its fair share—or even more than its fair share—of value.

This performance should ease the concerns of chemical-industry management teams that have been considering moving their companies closer to end consumers in the hope of gaining valuation upside in capital markets, since most customer industries have been less successful at creating value than chemicals. The performance should also be a consolation to senior-management teams that have felt on the defensive in the past few decades because of negative public perceptions of the chemical industry due to its environmental impact. These teams have been wondering how to gain favor from investors and the public by remaking their businesses as something other than chemical companies, at least in name, as evidenced by the lack of newly spun-off chemical companies with "chemical" in their names. Capital markets, in contrast, appear to have taken an unsentimental view on these issues; they are quite happy with the performance of the chemicals sector (Exhibit 1).

Not a growth play as an industry—but a solid earner

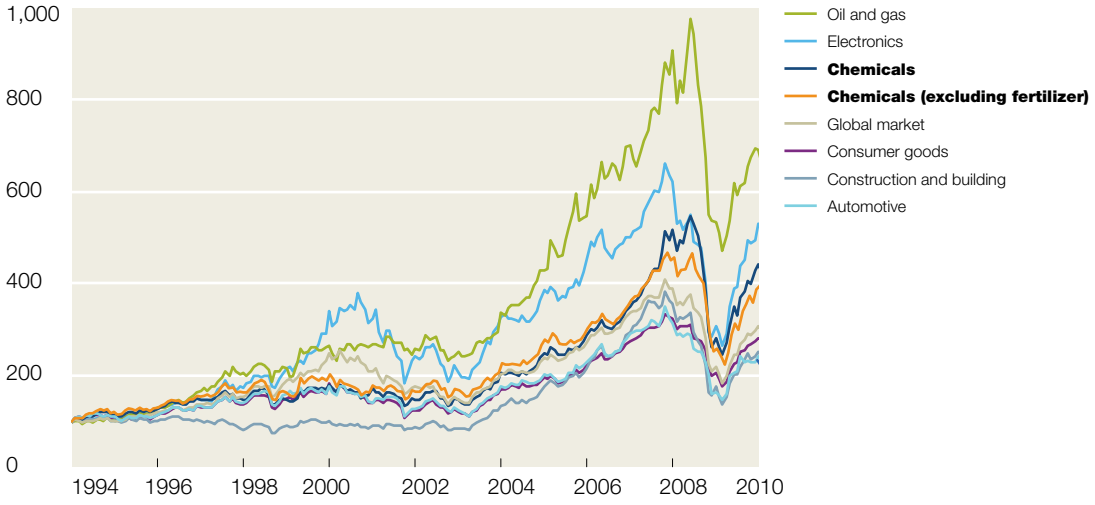
Capital markets provide a valuable perspective on how the chemical industry should regard itself—whether it should still look at itself as a growth play or rather as a middle-aged industry that is past its best days. For many chemical-company top-management teams, it has been somewhat painful to adjust to the reality that since at least the mid-1980s, the chemical industry has been a mature industry—albeit one

[1] Our analysis covers 100 chemical companies, each with sales of more than $1 billion per year, with an aggregate market capitalization of roughly $900 billion. Based on market capitalization at the end of March 2010, this accounts for an estimated 70 percent of the total market capitalization for chemicals. In most of our analysis, we excluded Saudi Basic Industries Corporation (SABIC), given that its high market capitalization would have introduced a bias. We gathered various performance metrics (for example, total return to shareholders, trading multiples, return on capital, cost of capital, and capital efficiency) but hand-adjusted reported numbers to make possible easier peer comparisons, for example, correcting for nonrecurring items, pension adjustments, operating-lease adjustments, and financial activities.

Exhibit 1

The chemical industry has outperformed the market and most of its customers in recent years.

Total return to shareholders, $
Indexed, 100 = December 31, 1993



Source: Datastream; McKinsey chemicals capital-markets perspective, 2010 update

that is profitable, still growing, and earning its cost of capital—and the mantle of "growth industry" has passed to information technology and other sectors. This has led to much soul-searching, as companies have attempted to find the right balance between taking an innovation stance—chemicals' historic ticket to growth—and focusing on squeezing cash out of their businesses, an exercise further confused by the key enabling role of chemicals in many "hot" sectors such as solar and electronics.

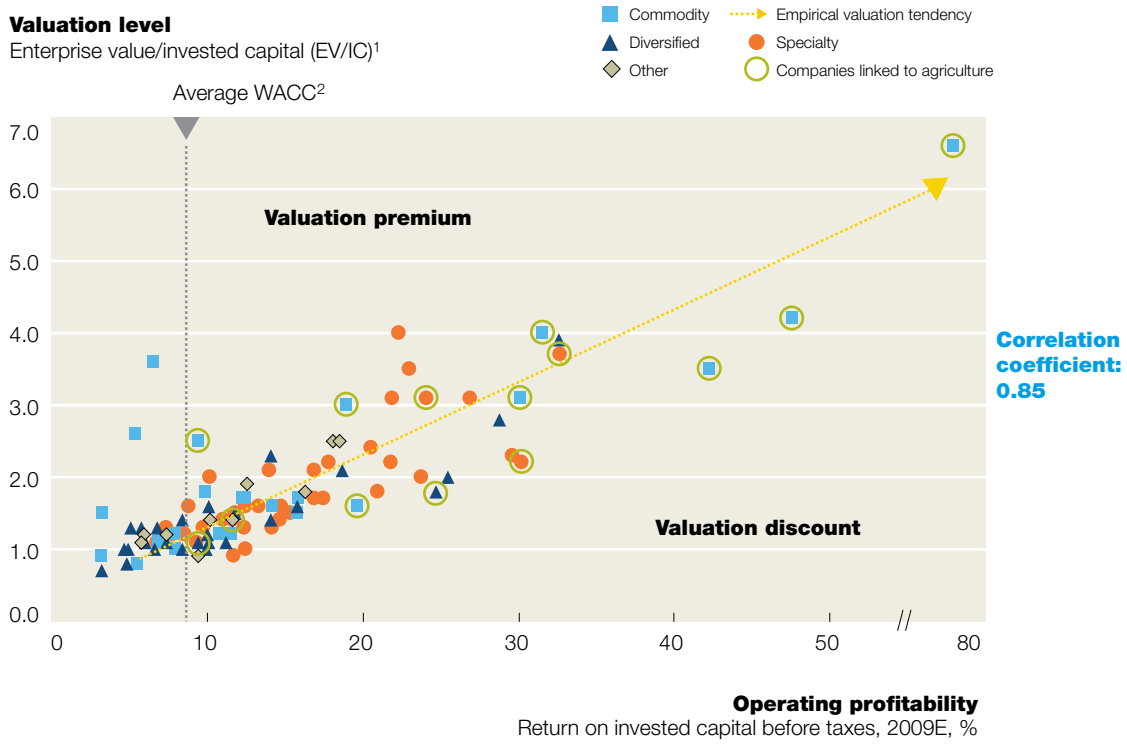
What do the markets say? To get to an answer, we analyzed the relative size of the two key components of capital-markets valuation, ROIC and growth expectations, across all companies in the analysis set. To do this, we calculated the correlation coefficient between valuation (with regard to its enterprise value to invested capital, or EV/IC, ratio) and operating profitability (ROIC before taxes). This calculation showed that in 2009, the correlation coefficient was at the very high level of 0.85, suggesting that the market was basing the largest portion of the valuation of chemical companies on income performance, with only a limited portion of the value attributed to variations in expectations for individual company growth (Exhibit 2).

Furthermore, our analysis shows that ROIC performance became the key determinant of chemical-company valuation in the eyes of capital markets over the past decade and that capital markets have observed less differentiation in growth expectations for companies across the three sectors that the chemical industry is commonly segregated into: specialty, commodity, and diversified. Put another way, it is increasingly hard for chemical companies to make a credible argument about growth prospects to shareholders.

That does not mean the markets expect the industry to stagnate: on the contrary, the markets expect companies to maintain at least 4 to 5 percent annual growth in a global market growing

Exhibit 2

Valuation of chemical companies happens on a 'show me the money' basis.



[1]IC including goodwill, 2009E market data as of February 26, 2010; IC = 2008 adjusted for latest quarter (2009) property, plants, and equipment; 2009 consensus estimate for earnings before interest, taxes, and amortization. Note: EV = market capitalization + debt + minority interest and preferred shares – total cash and cash equivalents.
[2]Weighted average cost of capital.

Source: Bloomberg; Datastream; McKinsey chemicals capital-markets perspective, 2010 update

overall at 3 percent. The overall capital-markets view is that the industry is mature and that it is unlikely that many companies will be able to create outstanding growth stories, but markets certainly like the shareholder returns it provides.

Rewarding individual growth stories

This observation about the growth profile of the chemical industry in aggregate, however, should not obscure the fact that there are some growth stories that do impress capital markets. The markets have rewarded such companies with valuations that exceed their performance strictly based on income, which means that value is being attributed to the companies' growth prospects.

As mentioned above, the fertilizer sector has recently enjoyed peak valuations and, along with other chemical companies serving the agriculture sector, has made up the largest group of "growth" chemical companies in the immediate pre-crisis period. The agriculture sector received a certain degree of hype in the late 2000s with the general commodities boom, the biofuels fad and related government subsidies, and food-shortage scares. This has resulted in capital-markets excitement about fertilizer stocks, particularly those in the potash sector. Crop-protection-chemicals and seeds companies also rode the same wave of market enthusiasm.

In addition, capital markets are attributing growth prospects to Taiwanese companies well-placed to serve Chinese demand growth, to chemical companies in the high-growth enzymes sector and in research chemicals for the life-sciences industries, and to chemicals and services for the hospitality industry.

Thus in the market's view, the chemicals sector does include areas with growth prospects. However, to consistently impress markets, top management must first make sure that the company excels in ROIC performance.

A dynamic sector, where success gets rewarded and weakness is punished

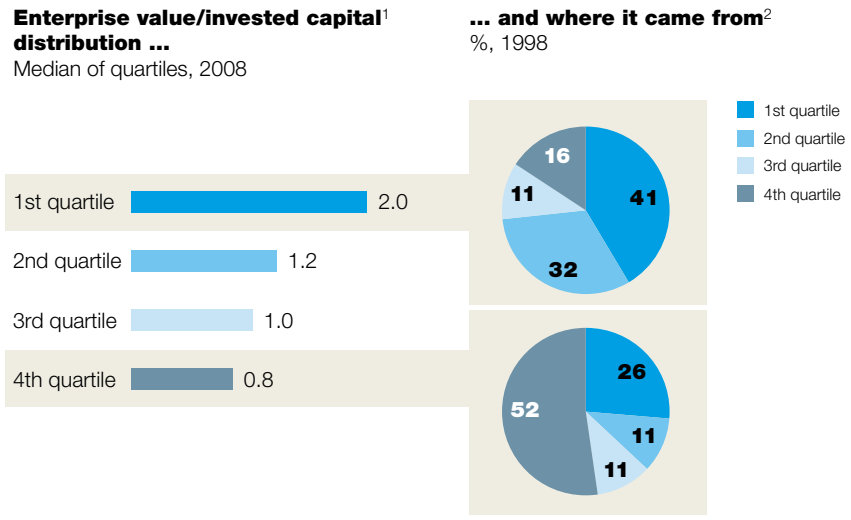
The capital-markets perspective underlines the degree to which the chemical sector is dynamic. This is shown by the fact that there continues to be significant mobility across all the industry's valuation-performance quartiles—demonstrating value creation (as well as value destruction) and making clear the high degree of sensitivity with which stock markets are following the performance of individual companies. For example, among top-quartile companies in 2008, fewer than half were in the quartile a decade ago. At the same time, 16 percent of top-quartile companies in 2008 had been bottom-quartile companies in 1998, while 25 percent of bottom-quartile companies in 2008 had been

There continues to be significant mobility across all the industry's valuation-performance quartiles—making clear the high degree of sensitivity with which stock markets are following the performance of individual companies

Exhibit 3

Capital markets remain highly alert to changes in performance trajectory.

Distribution of valuations in the chemical industry: changes in one decade



[1] Including goodwill.
[2] Excluding new entrants.

Source: McKinsey chemicals capital-markets perspective, 2010 update

in the top quartile in 1998. That mobility reflects the nature of this complex and fragmented industry, where changes in end-user demands and raw-material costs give companies opportunities to innovate and redefine their products and services in specific markets and geographies.

Thus, even though capital markets are showing an increasing assumption that growth differentials between chemical companies are converging, if a company changes its performance trajectory, capital markets are perceptive and reflect these changes in valuations. As a result, some companies move up and some drop down. The message from capital markets to senior-management teams: do not rest on your laurels—and if you are down, do not despair (Exhibit 3).

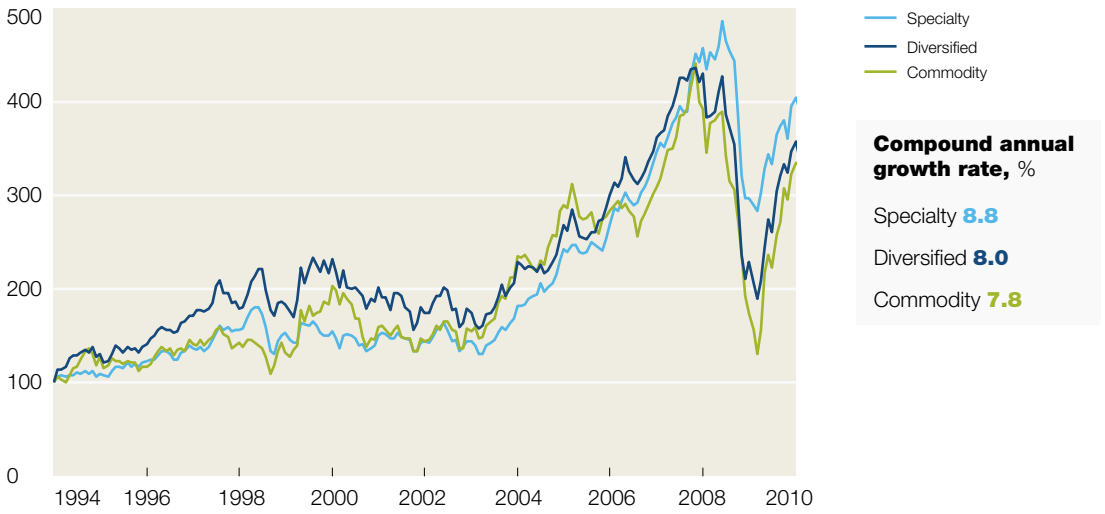
What strategies best drive chemical stocks' performance in capital markets?

What guidance does this analysis provide on how strategy correlates with strong performance? Since chemical companies' strategies are hard to classify, competing as they do in a range of product and geographic markets, we chose to examine performance relative to some easily measurable dimensions of how a company operated—such as scale, product and portfolio focus, or geography. That analysis let us test a number of hypotheses about what drives value creation, defined as total return to shareholders, market-to-book valuation, and ROIC. Using data from 1994 to 2009, there are a number of observations that can be made.

Exhibit 4

Chemical segments perform roughly in line with one another.

Cumulative total return to shareholders[1]
$, indexed: 100 = December 31, 1993



[1] Sample excludes Saudi Basic Industries Corporation (SABIC) and fertilizer companies.
Source: Datastream; McKinsey chemicals capital-markets perspective, 2010 update

Portfolio. Our analysis shows that all the chemical segments (specialty, commodity, and diversified) performed roughly in line with one another from 1994 to 2009. Capital markets have favored certain segments during certain limited time periods. For example, analysis that we undertook of the 1992 to 2003 period[2] showed that diversified companies performed best, followed by specialties; commodities performed worst. However, when we extend the analysis to 2009, it becomes difficult to identify a consistent trend over time. Put another way, portfolio differences for specialties, commodities, and diversified players have not translated into better or worse performance; all segments are in line with one another (Exhibit 4).

To achieve top-tier performance, portfolio seems to play a role—but it is not portfolio in the sense of specialty versus commodity. Instead, it is more nuanced and specific to certain subsectors. It is impossible to make comparisons at the level of companies, as most companies have different portfolios, but it is possible to identify the performance of individual businesses.

Our return-on-sales (ROS) analysis of individual businesses shows that while some sectors clearly have higher ROS, the spread of performance by sector participants is quite large. For example, specialty electronic chemicals achieved higher ROS from 2001 to 2008 than basic electronic chemicals. However, the variations in performance

[2] See Thomas Augat, Eric Bartels, and Florian Budde, "Multiple choice for the chemical industry," www.mckinseyquarterly.com, August 2003, and Thomas Augat, Eric Bartels, and Florian Budde, "Structural drivers of value creation in the chemical industry," in *Value Creation: Strategies for the Chemical Industry*, Weinheim, Germany: Wiley-VCH Verlag, 2006, pp. 27–39.

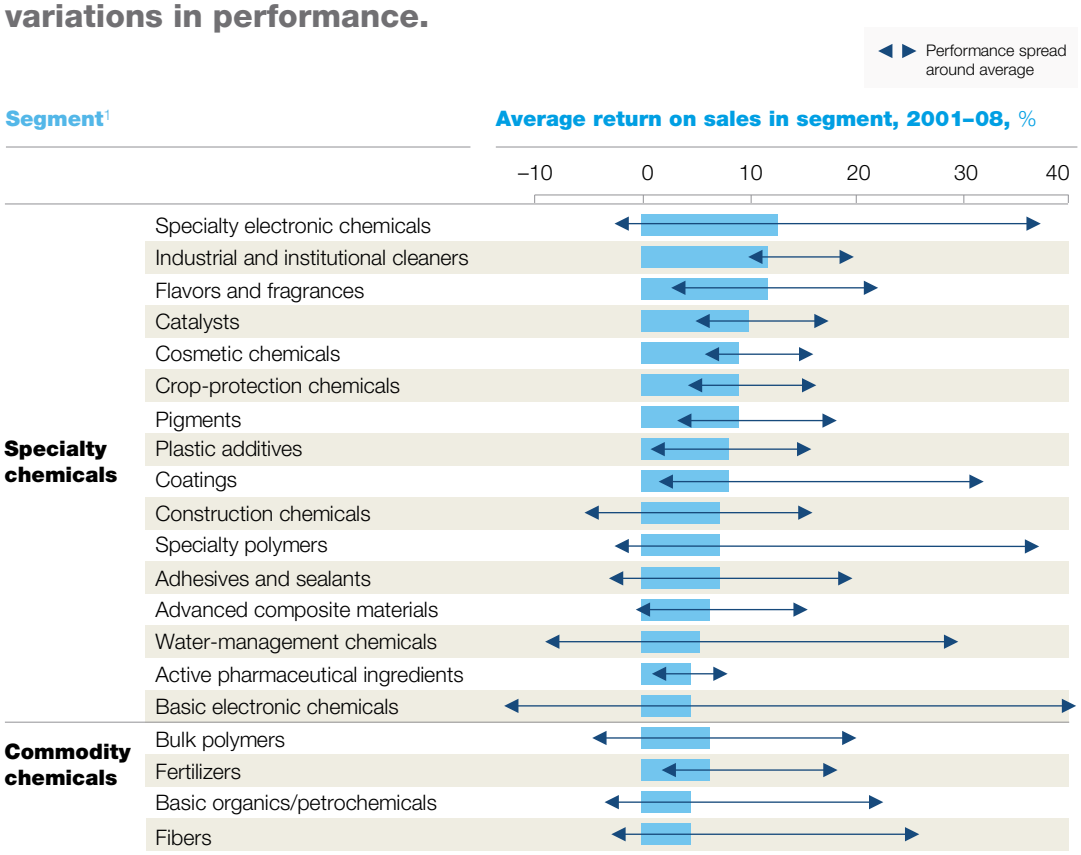
around the average are substantial, and so performance has to be assessed on a company-by-company basis (Exhibit 5).

This holds a clear message for senior-management teams. Before rushing to abandon apparently dowdy sectors and trying to move into supposedly more attractive sectors, management must first ensure that it cannot improve performance in the lackluster sector, or, if the company is determined to switch, make sure it can become a top performer in the attractive sector. Presence in an attractive sector is no guarantee of success—and neither does it provide an excuse for poor performance in ROIC.

Megatrends. One further portfolio-related analysis that we undertook focused on whether

Exhibit 5

The average profitability of a business segment is no guarantee of success: participants show wide variations in performance.



[1]Based on SRI segmentation.

Source: Bloomberg; Reuters; SRI International; McKinsey analysis

Lessons from the crisis:
The market rewards tough actions and rigorous management

We analyzed capital-markets performance during the financial crisis to understand lessons on how companies should respond to challenges. We examined the total-return-to-shareholders (TRS) performance of a representative group of 22 chemical companies, from an all-time high on June 17, 2008, to March 25, 2010.

When the economic crisis started in autumn 2008, the initial response from the capital markets was to drastically reduce the value of the chemical sector as a group, just as it did to all other sectors and to the market overall. This phase continued through March 2009, with little difference between top-quartile performers (TRS was down 48 percent) and bottom-quartile performers (TRS was down 66 percent). But when the capital markets started to get over the initial panic and recover their senses, they revised this initial judgment and showed appreciation for the differences between individual chemical companies' performance and prospects.

This led to a segmentation of chemical companies during the recovery phase from March 2009 to March 2010 (exhibit). At one extreme was a group of companies made up of two segments: first, companies that were recognized as untouched by the crisis (for example, companies making flavors and fragrances and serving the food industry or high-end luxury-goods sector), and second, companies that visibly reacted to the crisis with cost-cutting and restructuring moves, which set them up to come out of the crisis stronger than before. Both these types of companies saw capital markets move their stock prices up, with top-quartile performers up 72 percent in the period.

At the other extreme were companies that were hit hard by the crisis, primarily because of the weakness of their balance sheets going into the crisis or because the capital markets recognized their existing strategies would not be successful in the "new normal." Their valuations remained depressed, recovering only 28 percent. In the middle were companies that did not react aggressively to the crisis and were waiting for the storm to pass. Many such companies had robust business models, but by failing to make rigorous moves to cut costs and improve operations, they emerged weaker relative to companies that seized the opportunity for action presented by the crisis.

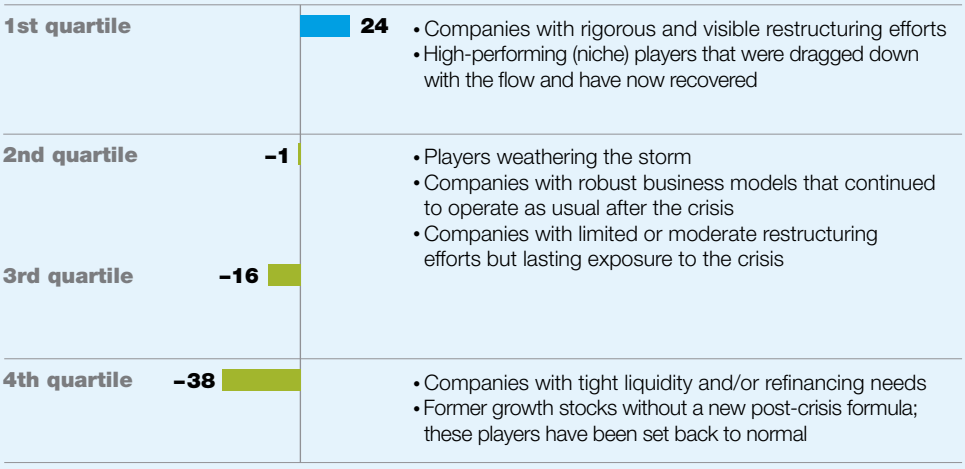
These events provide a clear indication that capital markets do respond to individual companies' situations and actions. Management teams that reacted decisively and took highly visible actions were rewarded by the markets.

While the crisis was a short period of exceptional stress, it confirms the enduring message of the capital markets: chemical companies should keep their focus on strong ROIC performance.

Exhibit

Patterns that emerged during the crisis show capital markets favored companies that seized cost-cutting opportunities.

Median annualized total return to shareholders: all-time high to turning point[1]
%



[1]From all-time high on June 17, 2008, to March 25, 2010; indexed with starting date of June 30, 2008.
Source: Datastream; McKinsey chemicals capital-markets perspective, 2010 update

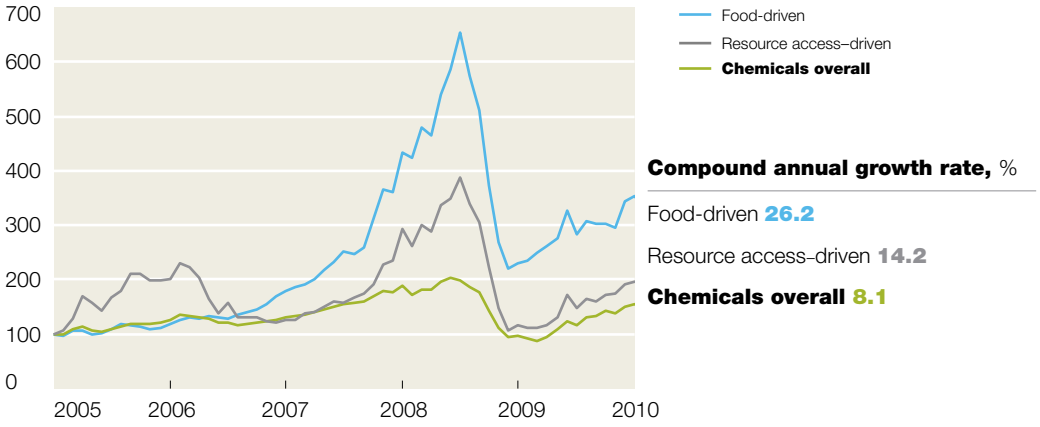
capital markets have favored chemical companies that are linked to and riding global megatrends—trends that are having a broad societal and economic impact worldwide. Looking at market performance since 2005, we found that chemical companies associated with two megatrends—population growth and the unconstrained demand for limited resources—have outperformed overall chemicals in capital markets. The first group consists of chemical companies that supply to the agricultural and food industry (including fertilizer, crop-protection-chemicals, and seeds companies), and the second group comprises companies with privileged access to natural resources through backward integration. What chemical-industry senior-management teams must remember, however, before trying to hitch themselves to one of these megatrends, is that the consistent message from capital markets is that any strategic move must focus on generating good ROIC performance. Any move related to megatrends must also bring strong ROIC performance with it for it to be viewed favorably by the markets (Exhibit 6).

Focus. Focused companies have performed better in recent years than unfocused companies. We define focused companies as those with more than 80 percent of sales in two businesses; unfocused companies are those with less than 50 percent of sales in two businesses. The strong performance of fertilizer companies has helped amplify this trend, but even when fertilizer companies are excluded from the analysis, the superior performance of focused companies stands out.

Exhibit 6

Companies associated with megatrends outperformed the broader market.

Cumulative total return to shareholders
$, indexed: 100 = December 31, 2004



Source: Datastream; McKinsey chemicals capital-markets perspective, 2010 update

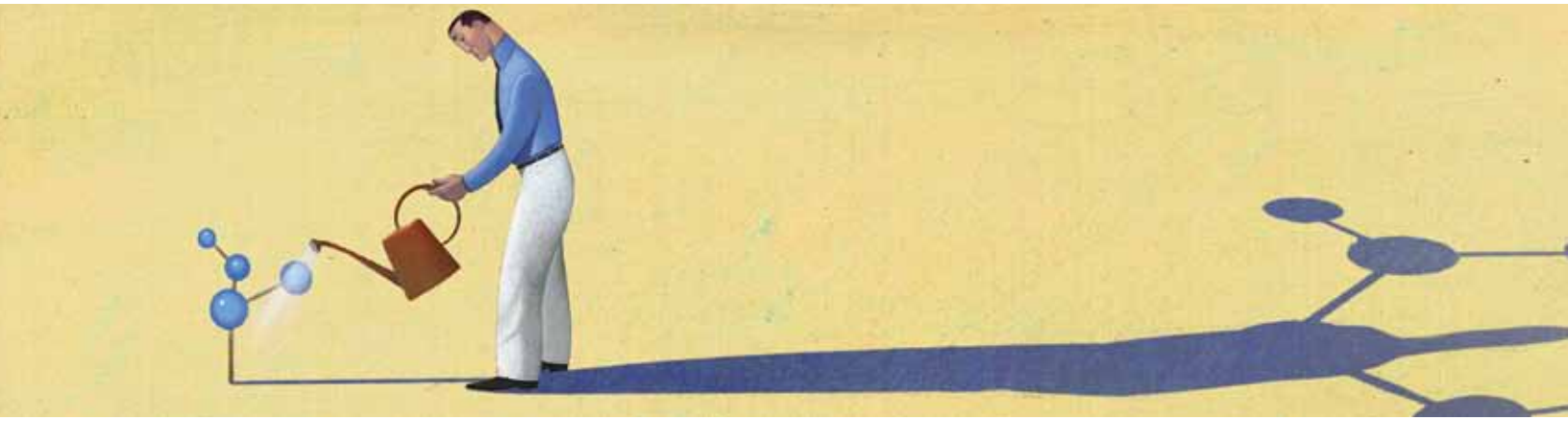
Size. For specialty chemicals, size clearly matters: larger specialty companies consistently outperform smaller ones on TRS. For commodity companies, larger companies outperformed smaller ones until the crisis, but since then, performance has converged.

Region. Asian markets (excluding Japan) have done well because of growth in the region; economic growth translates into growth in demand for the chemical industry. Europe has also done well, primarily because the European chemical index is largely driven by German companies, which have increased their productivity and taken away share from non-German competitors in the eurozone. Japanese companies continue to be weak, and North American companies are somewhere in the middle.

• • •

Our analysis of the 16 years of data shows that capital markets do not regard chemical companies' sector affiliation—specialty or commodity—as an indicator for superior or inferior performance. Put another way, although it is commonly believed, for example, that investors prefer noncyclical specialty stocks to commodities, there is no empirical basis for such a claim. What does stand out, however, is that capital markets are taking a conservative view of chemical companies' ability to differentiate themselves with regard to growth and instead are focused on companies' ROIC performance and its development over time. Markets are finely tuned to changes in the performance trajectories of individual companies, and winners must therefore remain on top of their game. While capital-markets performance in the past five years has shown chemical companies that ride megatrends have excelled, experience has shown that capital-markets favorites can quickly change. The message from the capital markets that endures, however, is that ROIC performance matters above all.

Florian Budde (Florian_Budde@McKinsey.com) is a director in McKinsey's Frankfurt office, global chair of the chemicals practice, and leader of its Europe, Middle East, and Africa chemicals practice. **Geert Gyselinck** (Geert_Gyselinck@McKinsey.com) is an associate principal in the Antwerp office. **Christoph Schmitz** (Christoph_Schmitz@McKinsey.com) is a principal in the Frankfurt office.



Innovation in chemicals:
An interview with Dow Corning's Stephanie Burns and Gregg Zank

Dow Corning's CEO and CTO talk about successful approaches to new-product and business-model innovation.

Bob Frei and Chris Musso

Dow Corning's performance in the past decade is one of the more overlooked success stories of the global chemical industry. Privately held by Dow Chemical and Corning, Dow Corning is the world's top silicones producer and, through its majority stake in Hemlock Semiconductor Group, the leading maker of polycrystalline silicon (polysilicon), the raw material for computer chips and solar cells. Dow Corning has historically seen steady growth, but in the past six years, its performance has accelerated dramatically, and innovation has played a key role in this.

Dow Corning has always grown by combining a capability in low-cost bulk silicones with leadership in silicon-based specialty chemicals. It continues to follow this approach, with a new large-scale plant in Zhangjiagang, China (a joint venture with Wacker Chemie), which will complement its large-scale plants in the United States and the United Kingdom. Similarly, in polysilicon, Hemlock Semiconductor is building a new plant in Clarksville, Tennessee, to maintain its capacity and cost lead.

What is new is the acceleration of the company's sales and earnings trajectory. Part of this is being driven by strong growth in demand in developing markets such as China. Dow Corning's low-cost manufacturing base puts it in a strong position to serve this demand, but the company is not simply sitting back while it rides that wave. Instead, it has made a significant push in innovation to strengthen its

growth momentum. It has drastically redesigned and reenergized its new-product-development approach, and at the same time has emerged as a chemical-industry leader in business-model innovation.

In 2002, in the fading days of the dot-com boom, Dow Corning took a bold gamble when it launched Xiameter, a new business model comprising an online-managed, low-cost, no-frills sales channel for its commodity silicones, offering competitive pricing to customers willing to buy in bulk, without research or technical support. Plenty of other chemical companies were dabbling in e-commerce, but none embraced a business model that effectively divided the company's products into two brands, as in this case, where there was the traditional Dow Corning on the one hand, offering customers specialty silicones backed up by technical support and R&D, and Xiameter on the other.

Dow Corning confirmed the success of the new business model in 2009 when it announced a fivefold increase in the number of products it offers via Xiameter. Meanwhile, sales growth based on new-product innovation has continued to accelerate.

The financial results bear this out. Dow Corning saw sales rise from $2.49 billion in 1995 to $3.37 billion in 2004, when it exited from its nine-year Chapter 11 bankruptcy protection linked to breast-implant liabilities, a compound annual growth rate of 3 percent. Net income rose from $153 million in 1995 to $289 million in 2004. Its sales then rose 62 percent in the next four years, reaching $5.45 billion in 2008, a compound annual growth rate of 13 percent, and its net income increased more than two-and-a-half times to $739 million. After a retreat in 2009, results rebounded in the first nine months of 2010; sales hit $4.4 billion and net income was $615 million, putting it on a trajectory for its best-ever results in 2010.

Stephanie Burns, a PhD chemist, has been Dow Corning's CEO since 2004 and has led these developments. She and Gregg Zank, the company's chief technology officer and senior vice president, sat down recently at their Midland, Michigan, headquarters with McKinsey's Bob Frei and Chris Musso to discuss their perspectives on successful innovation in the chemical industry.

McKinsey on Chemicals: *Where does innovation stand among your priorities?*

Stephanie Burns: Innovation is definitely one of the very top priorities for the company. It's our future—it's the way we're going to grow. We divide the very substantial growth we have achieved over the past nine years into three categories, and there's been a major innovation component to all of them. The first is momentum growth, which is directly linked to GDP expansion around the world, and Xiameter has brought us a lot of growth there. The second is penetrating new geographies with our technology, and innovation plays an important role here because we'll often do formulations that are specific for the geography or employ innovative business models that allow us to expand in a particular region. The third category is more traditional, "pure" innovation—new applications and products. All three categories have contributed to growth, with the biggest shares driven by the second and third categories.

McKinsey on Chemicals: *How has your approach to innovation changed in the past decade?*

Stephanie Burns: Ten years ago, our innovation approach was mostly the traditional, inside-out

materials-innovation approach. But we decided that this approach was not working well—we really needed to deliver greater returns from our strategic R&D investments. Reevaluating our approach to innovation has been part of a complete rethink of Dow Corning's business. Dow Corning has always enjoyed respectable growth rates across most of its businesses, and for better or worse this led to an attitude in the company that every business is a growth business, and an attitude to R&D spending where everyone gets the same level of investment, and people across the company felt almost entitled to a certain level of investment.

But in the early 2000s, we could see that parts of our portfolio were maturing and becoming less differentiated, and the service-intensive specialty-chemical approach to doing business was no longer wanted by parts of our customer base. Those customers were mainly interested in the most competitive prices for undifferentiated products, backed by reliable supply. Seeing this and recognizing that there was going to be more of this trend coming was a major driver for us in our design of the Xiameter business model. We couldn't treat those more price-sensitive and innovation-insensitive customers the same as our specialty customers. And so we separated our product offering into two brands: the Xiameter brand and the Dow Corning brand.

Gregg Zank: And at the same time, we recognized that we needed to rethink our approach to new-product innovation across all our businesses. To get better returns, we saw that we couldn't invest in every market the same, but we needed to be selective and choose those innovation areas where we're going to get the biggest returns and have the biggest impact on the company.

McKinsey on Chemicals: *How did you deal with the challenges and cultural issues within the company when making this change?*

Stephanie Burns: I think we have been successful in this because we defined a really clear business model—Xiameter—for our undifferentiated business. We have been very clear on what that brand represents and what its goals are for cash generation and contribution to the earnings of the company. That business model is all about efficiency and quality of supply to our customers at a price point that allows them to really be competitive. Customers are not asking for a lot of product innovation in that space, so that would be an area where we are not going to put research dollars, except toward process improvements.

At the same time, we have been very clear on the differentiated side of the company about which areas we wish to invest in and what our customer acceptance and financial expectations are, and we have shifted resources to priority areas.

We had to communicate clearly that it's just as important to work in area A as area B, and that both are critical to serve our customers. We're going to create growth in each unit, but they have different mandates and deliverables. It has taken time to get the teams comfortable with this, but now people see the success and so they are buying into it with great commitment.

I think that one advantage we have culturally is that we have employees who are extremely creative and willing to try new things, and who do not resist change the way that perhaps they do in some other companies. We've worked hard on encouraging the dynamic that it's healthy to embrace change. It comes down to leadership and clarity of purpose.

Stephanie Burns

Vital statistics
Born 1955
Married, with 1 child

Education
Graduated with a PhD in organic chemistry, with a specialty in organosilicons, in 1982 from Iowa State University

Pursued postdoctoral studies at Université Montpellier 2 Sciences et Techniques, France

Career highlights
Dow Corning
(1983–present)

(2006–present)
Chairman
and (2004–present)
chief executive
(2003–2010)
President

(2000–2003)
Executive vice president for global operations

(1997–2000)
Director of the electronics and life-sciences businesses and of science and technology for Europe

(1994–1997)
Director of women's health

(1983–1994)
Positions in laboratory research, product development, science and technology, and business management

Fast facts
Incoming chairman of the American Chemistry Council

Member of the board of GlaxoSmithKline and of the Society for Women's Health Research

Appointed to the President's Export Council in 2010

Named to Forbes.com's list of the world's 100 most powerful women

This certainly has required changes in behavior. Take the salespeople in our specialty-chemical business: their job out in the field is to do new-business development and work with customers on new areas of growth—it's not to go in and sell existing products to existing customers with the same application that they've sold for the past five years. So they've had a real change in their mandate.

With our relaunch of Xiameter in 2009, not only did we put more products into Xiameter but we also continued to fine-tune these two business models—Xiameter and specialty-oriented Dow Corning—and add more clarity. We still had some undifferentiated products managed by our specialty business, and by moving them to Xiameter, we have been able to serve our customers with more clarity.

We will do that kind of fine-tuning constantly in the future. A product may currently be managed by our life-sciences business or industrial-intermediates business, but as the products mature, we're going to challenge the business every year: should that be a Dow Corning–branded product or should it be managed by Xiameter? And we'll move products over as appropriate.

Gregg Zank

Vital statistics
Born 1958
Married, with 2 children

Education
Graduated with a PhD in inorganic chemistry in 1985 from the University of Illinois at Urbana-Champaign

Career highlights
Dow Corning
(1985–present)

(2009–present)
Senior vice president

(2003–present)
Chief technology officer and executive director for specialties and technology

(2002–03)
Program leader for new-business development

(1985–2002)
Positions in research, product development, and new-business management

Fast facts
Holds 30 patents for innovations including those related to advanced composites, rechargeable batteries, and high-temperature thermosetting polymers

Reviewer with the National Science Foundation

Member of the board of directors of the Michigan Molecular Institute

Member of Michigan's Climate Action Council

Recipient of the American Chemical Society's Earle B. Barnes Award in 2009

Meanwhile, we are getting new specialty products from our innovation efforts to expand our Dow Corning portfolio that more than offset what is moved to Xiameter.

McKinsey on Chemicals: *How do you know when a product should move to Xiameter, and what are the challenges and opportunities?*

Gregg Zank: It's not by our definition that a product is no longer differentiated—it's our customers' and the marketplace's. That in turn reinforces the message within the company that we have to embrace this new business model. There are clear signals when a product is in the undifferentiated area. For instance, do we have intellectual property protecting our product, or are there a lot of similar products on offer from the competition? And when we go to visit the customer, are we meeting with the new-business developer or only with the procurement team? That's a pretty strong signal right there.

Stephanie Burns: But it's important to recognize that there is a huge opportunity in the Xiameter model, not only in providing customers with reliable supply at a certain price point but also for the company overall as the low-cost, highly efficient supplier. We are winning at that low-cost game, and we're going to continue to

win. We've got fully utilized assets and efficiencies in our manufacturing operations that we believe are the most competitive in the industry.

The offtake of the large, low-cost plants also goes into our specialty business, where we develop finished, formulated products, and we get a lot more value than just selling the basic intermediates. So the innovation that goes on in our specialty plants that leverages this low-cost position is a wonderful synergy.

And at the same time, there are a lot of innovation challenges posed by the Xiameter side of the business. For instance, how do we get a product line's cost down to stay competitive and make the right level of return? There's a lot of energy and excitement going into improving manufacturing and process efficiency, as well as on the business and commercial side. It can be just as exciting as new-product innovation.

McKinsey on Chemicals: *What are your thoughts on new-product versus business-model innovation?*

Gregg Zank: It's not black-and-white. The days are gone when you could just make a new product and customers would beat a path to your door. To be successful in the marketplace and establish a sustainable competitive advantage requires a combination of approaches. The key for us is customer intimacy, which guides us as to which levers of innovation we should employ—how much new product and new technology, how much new solutions, and how much business-model innovation. It's also important to consider regional differences: mature products in one region may be innovative products in another. At the same time, there may be a need to explore a new business model, packaging, or delivery method, for example, to successfully deploy a product line in a certain region.

Stephanie Burns: In business-model innovation, our big "aha" came with Xiameter. That really opened the door for us to think differently, and we've realized that new business models are just as critical for new-product development as they are in the more mature parts of our business. We deployed new ways of working with our partners: for instance, faster prototyping or finding different ways to more quickly establish profitability. And in our polysilicon business, we have implemented new business models designed to ensure that we meet our needs and our customers' needs.

McKinsey on Chemicals: *How do you steer your new-product innovation approach?*

Gregg Zank: We want to focus on areas that are driven by large societal trends and needs in the world—megatrends—because we know those trends are going to drive discontinuities in the marketplace. There are a number of areas we are particularly interested in. These include health care and personal care, renewable energy, construction, and electronics—where we are looking at the ever-expanding demand for devices and the merger of electronics with other areas such as photonics and biotechnology. And we are watching how megatrends—such as energy scarcity, urbanization, and others—interact with these.

When you're tied into those discontinuities, it just means the market opportunity is big. You're not in there fighting tooth and nail using price and

other levers for a piece of a limited-size market—instead you're in a market that is expanding rapidly. Light-emitting diodes (LEDs) are a great example—they're now showing up in flashlights, displays, traffic lights, and in automobile exteriors and interiors, and they have the potential to keep growing into areas of commercial and residential construction.

Encapsulants for LEDs have been a great success story for us. We started the work in the late 1990s, and it became a new-business program in the early 2000s that was sheltered even though it was not making any money. We backed it because we knew it was going to be a hit. We had key intellectual property; it's a very enabling technology; and we were ready to go when the market was ready. Our encapsulant business has grown dramatically over the past five years.

We are on the lookout for developments that are truly going to be disruptive and try to tie ourselves to them. We constantly challenge ourselves and refresh that list of the large trends that we should be looking at, and then we ask, how can silicon-based materials provide a solution?

Stephanie Burns: What we've been doing over the past four years is to take these megatrends and apply filters that narrow them down to what really could be the opportunity, and identify how best our technology and competencies match that. We're not just saying there's a wonderful megatrend out there in the demographic of an aging population and we're going to invest all our projects against it, but instead, we're defining where the opportunities are for Dow Corning. We've been improving that process and have started to integrate it across the company.

McKinsey on Chemicals: *How does the process work?*

Gregg Zank: Our underlying challenge was to improve the way we develop a raw idea into something tangible. The approach we now use is to work very intensively for a highly compressed period of time—10 to 12 weeks. We will take something as large as the societal impact of an aging population and distill that down with numerous interviews outside the company. We dedicate a group of employees around the world to undertake a lot of strategic marketing—both technical people, who are in my opinion very good early-stage strategic marketers because they ask a lot of difficult questions, and commercial folks. Then we have weekly meetings to say, what have we learned about this area? It's got to be a large opportunity, it's got to get marketplace acceptance within a certain time frame, and it's got to be something that is not incremental to what we are already doing. We assess the applicability of our scientific tool kit against the opportunity and create an early proposal.

There's a level of research expenditure that must be maintained even in tough times—it's not discretionary spending; it's required

We pressure-test the proposals from the points of view of technology, the market, the supply chain, and whether it will still be a good opportunity if some other external factors change. It is a difficult thing for the team to go through because they want to chase five things and they only have time to get two worked up as full business proposals. But I'm insistent that as we go through this, we capture and document all the things that we leave on the side as well, because they may be relevant for some of our other existing businesses. In addition, the process can help us identify markets that are starting to move and make us check if we are in tune with them. Are they on our radar screen, and how are we interacting in the value chain of those markets?

We undertake this process twice a year. In addition to identifying opportunities, it completely energizes the entire company, because there is not only a core team but also a broader team that gets involved because there are Web calls for information, where people can contribute, so everybody is a part of it. We end up with a pretty robust portfolio of initiatives as the process cycle proceeds.

McKinsey on Chemicals: *Have any cultural issues emerged with the adoption of the megatrends approach?*

Gregg Zank: The danger we have run into is not so much resistance as that everyone reframes what was already going on to be part of a megatrend, and everything becomes a green-energy project or an aging-population project. That's why we have these filters and say, OK, within the aging population, what are the big things that we think we can have an impact on and that have enough discontinuities and opportunities associated with them to represent a large area of growth for a significant amount of time?

Stephanie Burns: We also have to take some care managing the filtering part of the process—this is the painful part, where you have to let go of ideas early on that you don't think are a hit and stay focused on the ones that look promising. When we started this process, our people got so enthused by innovation and sustainability and improving our planet, and they were buying in fast and looking at things that we knew were not going to fly. But you've got to let them expand the lists of ideas, so that they say, this is new and exciting, and to make sure they're going along the path with you. You can't shut it off prematurely; you have to let it run its course.

McKinsey on Chemicals: *What are examples of megatrend-linked work?*

Gregg Zank: One of the problems with the aging population is diseases that make bones brittle. So you can look at ways to protect the human body from falls or ways to better enhance bone growth in aging people. Since there is research relating bone strength to silica intake, we said, is there a way to help uptake of silicic acid or silica into the body to help bones be less brittle? Another is enhancing aging bodies' efficiency in absorbing medicinal drugs, and so, is there some way to use silicones to help the uptake of drugs?

Stephanie Burns: We also see megatrends intersect. For example, one of the trends with an aging population is that baby boomers want to live in their own homes rather than in a nursing home. To take care of them and make sure they're safe, third parties observe them in their homes, and so there are new electronics

applications, as you get to surveillance cameras and sensors. In other words, the electronics megatrend intersects with the aging-population megatrend.

McKinsey on Chemicals: *Dow Corning seems to have shifted its R&D talent strategy to include more than just silicone chemists, hiring physicists, materials scientists, and even industrial designers. How has this new combination changed the innovation problem-solving dynamic?*

Gregg Zank: It's a great new dynamic. When you combine a silicone chemist with a material scientist, a ceramist, and a metallurgist, you get some very robust technology debates, and you get to a good answer—not yet necessarily the right answer—but one you have a lot more confidence in, because you did not just charge down one path.

Stephanie Burns: Here's an example. We know a lot of our customers buy our materials for the aesthetic properties—the feel, or "hand," as it's called, the silky touch, the visual appearance. But we realized that there's a whole element in how customers make buying decisions that we did not fully understand. When silicone ends up in a piece of furniture or cookware, we don't know who these people are who are selecting the product. When a maker of handheld electronic devices looks at silicones, they are looking for the customer experience as well as the electronic-circuitry performance, which we always focused on. So we brought in an industrial-design engineer who thinks completely differently from a chemist or physicist, and this brings a totally different dynamic to the team's interactions.

McKinsey on Chemicals: *Is being just in silicon chemistry a limitation?*

Stephanie Burns: I'd argue our chemistry set is probably more complex than most companies', and our expertise in that chemistry set allows us to do so many more things. I am constantly amazed at the potential of silicon technology to meet the needs of current and future advanced applications.

I think we are able to build closer and stronger relationships with customers because our silicon-based expertise can be so enabling for them. Take skin-care product makers: they use thousands of different ingredients to make formulations, but the silicone ingredient enables that formulation to perform, and that gives us privileged access to their research department. And we've deliberately built up a capability we call "application expertise," where we have scientists who are world-renowned experts in many of our customers' applications. In hair care, for example, we have globally respected experts on how to test products on hair, and our personal-care customers recognize and respect these experts' work.

McKinsey on Chemicals: *How much time do you as CEO spend on innovation?*

Stephanie Burns: As CEO, I would say around 15 percent on a pure innovation basis, but innovation is part of everything we do, so it is difficult to estimate. I do have a very full understanding of the innovation portfolio, which is on all our major executive-meeting agendas.

McKinsey on Chemicals: *What does it mean to have a scientist as CEO?*

Stephanie Burns: When I am out with R&D folks and teams that are bringing projects forward, there's probably an ease of discussion

and a connectivity that takes place. The last time I was with our compound semiconductor research team, for instance, I understood exactly what they were doing and the progress they have made in advancing silicon carbide wafer-production technology.

Most important, I think I probably have, compared with a nonscientist, a better understanding that this innovation stuff takes time to come to fruition, and that you've got to keep these investments consistent and you cannot flip-flop. Some of our big successes today had their genesis back in the late 1990s. In tough economic times, you're looking to squeeze anything you can, and innovation is not immune to that, but there's a level of research expenditure that must be maintained—it's not discretionary expenditure. It's required.

Bob Frei (Bob_Frei@McKinsey.com) is a director in McKinsey's Chicago office, and **Chris Musso** (Chris_Musso@McKinsey.com) is an expert principal in the Cleveland office.

Capturing the lean energy opportunity in chemical manufacturing

High energy prices and climate-change concerns are driving new interest in energy efficiency. Companies can adapt their lean tools and approaches to capture significant energy savings.

Frank Plasschaert, Ken Somers, and Gautam Swaroop

Between 1990 and 2009, chemical companies were among the many industrial and manufacturing companies that boosted corporate performance by adopting lean production methods to optimize material and labor productivity. Indeed, a multiyear study of how well thousands of manufacturing companies in North America, Europe, and Asia adopted management best practices (including lean) highlighted just how important these practices are to a company's economic success (Exhibit 1).[1]

However, most chemical companies that have adopted lean techniques have not incorporated, or have only partly incorporated, lean techniques for increasing energy efficiency, even though energy costs have reemerged as a major issue for the industry over the past decade. European chemical companies, for example, have seen energy costs increase from 5 percent of total costs in 2002 to about 12 percent in 2009, driven primarily by rising oil prices, which have remained relatively high despite the economic slowdown.

Most companies have taken steps to lower their energy intensity (the amount of energy consumed per unit produced). The return on efforts to optimize energy usage was generally three times greater in 2009 than in the 1990s, and one major focus has been large capital-investment projects to capture energy savings, such as combined heat and power (CHP) plants. Energy-efficiency initiatives also

[1] The study, conducted from 2005 to 2008 by McKinsey and the London School of Economics, looked closely at how well manufacturing companies adopted proven best practices, such as lean, and at the relationship between these efforts and financial results. An early view on the research, published in 2006, is described in "*The link between management and productivity*," by Stephen J. Dorgan, John J. Dowdy, and Thomas M. Rippin, available at www.mckinseyquarterly.com.

enable companies to cut carbon dioxide emissions, thus providing companies with the means both to do the right thing and to save money.

Traditional lean programs typically identify savings that can be gained by improving every aspect of a manufacturing step, and this can include energy savings. But in our experience, traditional lean programs enable companies to realize only about one-sixth of their potential energy savings—leaving the rest on the table. Why? Few companies are making systematic efforts first to holistically map out energy consumption at each step in their operating processes or to identify specific energy waste in their production systems, and then to use lean techniques to focus on opportunities to reduce waste.

We have found that most chemical companies can substantially improve the overall energy efficiency of their operations when they apply lean tools and approaches that have been translated and adapted to cover energy use (Exhibit 2).

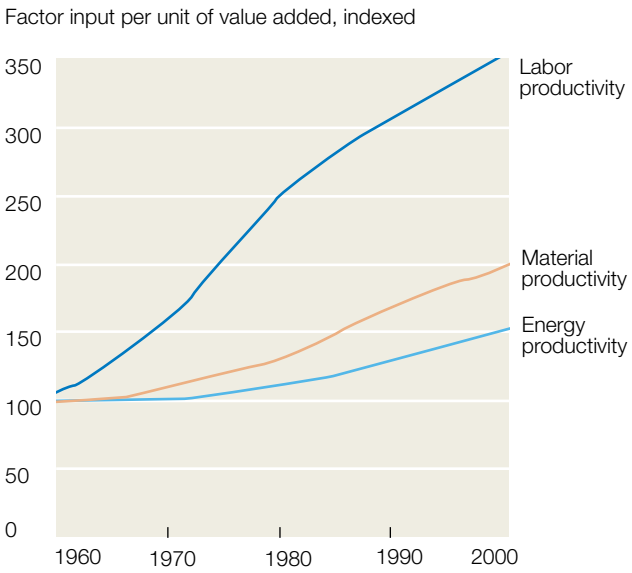
Exhibit 1

An analysis of the development of energy productivity over time suggests substantial improvement potential.

Current capabilities

- Optimizing lead and cycle times and preventing waste
- Managing organization using key performance indicators (KPIs) for quality and lead and cycle times
- Training and leading employees in shortening lead and cycle times and improving quality

Historical productivity improvements



New requirements to increase energy productivity

- Including energy efficiency in optimization levers
- Making energy consumption transparent
- Making waste detection systematic
- Developing methods to reduce waste
- Incorporating energy KPIs in management/ governance systems
- Building capabilities for continual energy-efficiency improvement

Source: Bundesministerium für Umwelt, Naturschutz, und Reaktorsicherheit (BMU) 2007; McKinsey analysis

Exhibit 2

Incorporating energy efficiency into lean methodology: there are eight kinds of waste for energy.

Kind of waste	Definition	Example
Overproduction	Producing excess energy (input energy that is unused)	Venting excess steam
Waiting	Consuming energy while production is stopped	Keeping stirrers at full speed in reactor while production batch is analyzed
Transportation	Inefficient transportation of energy	Leaks and heat radiation in steam network
Overspecification	Process energy consumption (deliberately) higher than necessary	Standardized reflux rates in distillation columns for all product specifications
Inventory	Stored goods use/lose energy	Using uninsulated tanks in tank farms where product must be kept heated
Rework/scrap	Insufficient reintegration in upstream process when quality is inadequate	Redrying polymer fines that did not get coagulated in drying process
Motion (inefficient processes)	Energy-inefficient processes	Excess oxygen in steam boiler
Employee potential/intellect	Failure to use people's potential to identify and prevent energy waste	Employees not involved in developing energy-saving initiatives

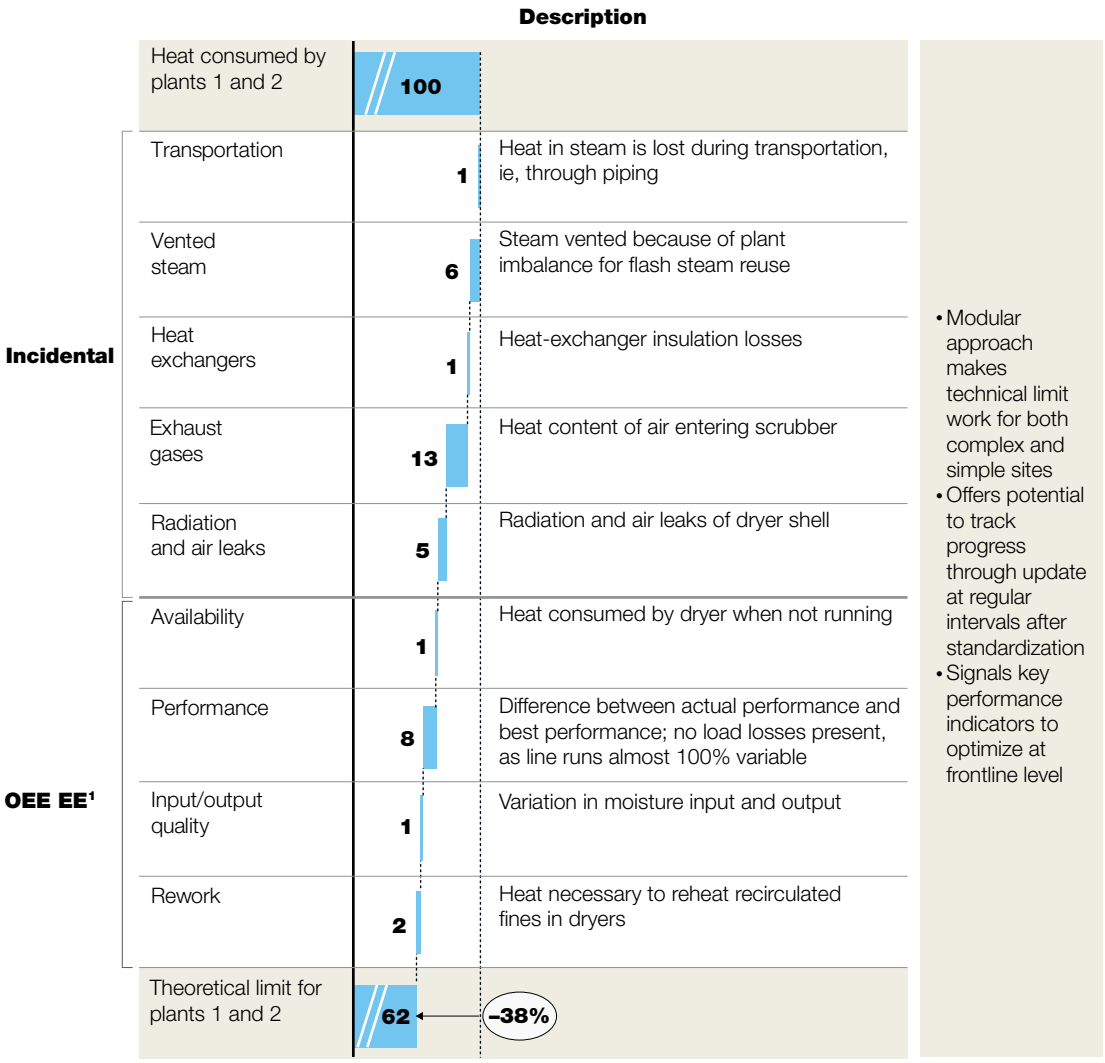
Savings vary by sector, but typical savings for chemical companies can be 10 to 20 percent—and in some cases, substantially higher. Importantly, all these savings can be achieved with limited investment and payback periods of three years or less. Energy consumption has traditionally been managed more carefully in the chemical industry's most energy-intensive processes, such as steam cracking or ammonia and chlor-alkali production, where energy is a major cost element. Nevertheless, we have seen savings of up to 5 percent achievable in such cases—important gains on such large energy volumes.

Taking the lean path to improving energy efficiency

Companies can realize these gains by incorporating energy-efficiency analyses and techniques into their existing lean approaches in four ways. First, they can focus specifically on energy consumption and then systematically identify waste as they would in any other lean program (Exhibit 3). Translating the lean value-add identification methodology to the energy context, the approach here is to map energy consumption at every step of a company's operating processes. The next step is to calculate the thermodynamically minimum energy

Exhibit 3

Building the theoretical limit for heat consumption creates clarity on losses while identifying potential key performance indicators.



[1]Energy efficiency (EE) linked to overall-equipment-efficiency (OEE) levers.

required for each process (its "theoretical limit") and evaluate actual consumption against this theoretical limit. This analysis reveals where energy is being wasted and how loss can be avoided, and it also provides a powerful motivating tool for site personnel to push for new ideas.

One US surfactant maker, for example, undertook a heat value-add analysis and found that only 10 percent of the steam heat inputs were actually thermodynamically required to make its products; 90 percent were wasted. Once the causes of the waste were identified, more than 20 measures were planned to address the problem. These measures would allow the company to capture steam savings worth $600,000 per year, and the investment would be paid back within three years. Loss of steam as it was piped around the plant represented one of the largest sources of waste, and it was addressed by insulating lines, repairing steam traps, and simply repairing leaks. The measures also included writing a new algorithm for the software steering the company's heating and cooling control loop, making possible 5 percent savings on total steam consumption. This initiative alone resulted in $75,000 per year of savings for just two days of the company's software engineer's time.

In another example, a chemical producer was able to reduce the energy bill on its storage operation by 50 percent by reorganizing its tank-storage strategy. Previously, it had operated multiple storage tanks, all of which had to be kept heated. By changing its storage procedure—following lean thinking on optimizing inventory to minimize waste, here with an energy focus—it consolidated on a limited number of tanks and closed the remainder for 90 percent of the time, eliminating the need to keep them heated when they were not being used.

A second way companies can extend their lean programs to improve energy efficiency is by optimizing energy integration in heating and cooling operations, moving beyond pinch analysis. A chemical company changed its process to release heat more quickly during polymerization, allowing evaporation to start sooner and saving energy on the subsequent drying stage. The total savings from both steps amounted to 10 percent and brought the production line close to the industry cost benchmark. In another example, a chlor-alkali maker undertook a number of measures to avoid heat loss and to capture waste heat via heat exchangers that enabled it to raise the temperature of the brine solution so that the electrolysis could attain a higher efficiency level. The investment paid for itself in a year and lowered energy consumption by 2 percent—a significant reduction, given the size of the chlor-alkali producer's power bill.

A third way that companies can use lean approaches is to identify process-design and equipment changes that can deliver greater energy efficiency. As already mentioned, chemical companies have responded to higher energy prices with substantial capital expenditures to capture energy savings. Complementing this, lean methodology makes an important contribution by helping to identify numerous smaller investments that can add up to major energy savings.

One chemical producer replaced traditional fixed-speed air compressors with high-efficiency variable-speed compressors, which led to savings

of up to 40 percent of electricity consumed to power its compressors—paying back the €200,000 investment in less than two years. Another company installed a blower-dryer combination to avoid using compressed air as a dry air source, and it saved €30,000 a year for an investment of €50,000. And at another site, a company installed a new heat sensor that enabled it to better manage its energy output—again having identified energy waste through the lean approach—and achieved savings of €64,000 per year for an investment of just €1,000.

A fourth area where lean energy approaches can eliminate waste and capture savings is optimizing the interface between producers—steam-boiler operators, cooling-water-unit operators, and power suppliers—and consumers. One chemical plant was reaching its boiler capacity and experiencing pressure drops at demand spikes, and it was therefore getting ready to invest $2 million in additional boiler capacity. By improving consumption planning, it was possible to make sure that demand would not pass the threshold that triggered pressure drops, and so the company was able to avoid making the boiler investment. At another site, a company captured substantial savings when it was able to get an accurate demand forecast from a third-party user it supplied. Previously, the producer had maintained steam production at the ready to meet unpredictable demand from its third-party user, but once it knew the demand timetable, it was able to put its boiler in power-saving mode during downtime.

To ensure that the gains are sustainable, companies must put into place a performance-management system for energy efficiency that will provide an objective basis for discussion. One company, for instance, spent about $300 million on energy a year, but it was having difficulties estab-

Focusing on theoretical limits stretches the organization's aspirations for energy savings that can be achieved with the existing asset configuration and product requirements

lishing appropriate key performance indicators (KPIs) for energy because it had little sense of how KPIs would change in response to operating decisions. As a result, it did not change its KPIs for two years. Once the company understood how it should correct for factors that play a part in energy consumption—such as price fluctuations, product mix, and throughput—the company was able to install meaningful KPIs. With these in place, the company was then able to make appropriate decisions and raise its energy efficiency.

Lean energy: The priority list for management

Implementing these lean energy-efficiency tools and approaches will require some new management approaches. Senior management at chemical companies will need to take several steps:

Focus attention on operational improvements versus the theoretical limit. In our experience, the most successful companies have moved their managers from a benchmarking mind-set to one focused instead on opportunities and closing gaps to theoretical limits for energy savings. This stretches the organization's aspirations for the energy savings that can be achieved with the existing asset configuration and product requirements. Given the product mix and site specificity of energy production, transport, and consumption, the benchmarking discussion will quickly devolve into an analysis of variance that leads only to incremental changes. Focusing instead on theoretically achievable energy efficiencies and on the identification of specific types of losses between actual and theoretical positions enables a far more fruitful discussion on potential improvement levers. Such a conversation will generate strong insights into the type and size of losses, and it forms a clearly quantified basis for relentlessly focusing on loss reduction.

Set up the right metrics. Frequently, the challenge for low-cost improvement starts with insufficient energy-consumption metering and energy-generation cost allocation. Improving these enables companies to identify operating changes that lower energy usage, such as reducing standby times. Better information about consumption and cost allocation also helps in developing meaningful KPIs. With a combination of energy-efficiency planning and employee training, low-cost, sustainable savings can be achieved. Relevant metrics would then include a clear correction for product mix, quality losses, and throughput variation.

Set targets for developing ideas. Companies must signal the importance of energy-cost reduction to employees and communicate this opportunity in the existing language of lean, and they should set targets to develop breakthrough energy-efficiency ideas. For instance,

they should emphasize the importance of ideas that involve little or no capital expenditure and that are generated through frontline engagement with plant workers, cross-functional problem solving, and changes in mind-sets and behaviors. In addition, senior managers should arm themselves with examples of what can be achieved—borrowing ideas from industry peers if necessary.

Put teams of experts in place. Many of the leading players in energy efficiency have invested in developing coaches trained in the discovery of energy waste, which is often invisible and tends to be spread across an entire plant. Identifying that waste requires specific technical knowledge, for example, steam production network economics or pinch analysis. In addition to technical knowledge, coaches must possess the ability to tap into frontline knowledge in order to identify solutions and mobilize personnel to capture savings in a manner similar to typical lean programs.

Frank Plasschaert (Frank_Plasschaert@McKinsey.com) is a principal in McKinsey's Antwerp office, where **Ken Somers** (Ken_Somers@McKinsey.com) is a consultant. **Gautam Swaroop** (Gautam_Swaroop@McKinsey.com) is an associate principal in the Delhi office.

Improving pricing and sales execution in chemicals

Some chemical companies have blind spots when it comes to steering sales—and they pay a high price in lost margins and growth. A sales-management approach built around a more granular level of insights makes it possible to improve sales execution and boost returns.

Joel Claret, Dieter Kiewell, Soenke Lehmitz, and Prashant Vaze

It is well recognized that improving companies' pricing and sales execution can have a significant impact on profitability. Our data, covering more than 1,000 commercial performance-improvement initiatives in a range of industries, show that when they are successful, such initiatives typically translate into an improvement in return on sales (ROS) of between 2 and 7 percent and lead to additional sales growth as well. In the chemical industry, successful pricing and sales-execution initiatives have mirrored these results in a variety of portfolios that encompass both specialty chemicals and commodities.

What is specific to chemicals? Initiatives to improve pricing and sales execution must overcome four main hurdles. First, although it is well established that sales profitability rather than sales volume is key to a company's performance, some chemical companies still do not have a clear understanding of the profitability of geographical regions, product lines, and individual customers or transactions, which can guide pricing and sales decisions. This is not for lack of data: most companies have copious sales information available through their enterprise-resource-planning (ERP) systems. But many companies are not able to organize or interpret the data appropriately to provide transparency on profitability, and so their sales representatives lack the right data to guide them when they are agreeing on sales contracts.

Next, the chemical industry's asset intensity encourages plants to be run flat out, generating production surpluses, and companies frequently suffer "leakage" from their official pricing structure, as production surpluses must be placed. If sales representatives are given incentives based on volume or revenue, they are likely to award ad hoc discounts and make other accommodations, such as offering free services, to win sales. Sales management, meanwhile, has difficulty precisely assessing the impact this has on margins and enforcing behavior that will maintain profitability.

Third, the chemical sector has had to confront extreme volatility in raw-materials prices in the past several years, creating serious challenges for products that are sold on longer-term contract periods than the company's raw-materials purchase contracts. Many companies do not have a clear understanding of which selling prices should rise and by how much—or, importantly, how quickly—to pass along the cost increases and maintain profitability. Lacking this information, companies may find it difficult to provide appropriate and timely guidance to their sales forces on the price levels needed to maintain profitability.

Finally, some chemical companies have a salesforce skills gap. Their salespeople are good at the traditional job of placing volume that keeps their production plants loaded, but many sales people have limited abilities to analyze sales data and limited negotiating skills to act on what the data show. This imposes a serious handicap on companies that want to move beyond simply recouping their costs to capturing pricing that reflects the distinctiveness of their product and its value to different customer segments. At the same time, some companies are monitoring individual salespeople with only simple metrics, which limits their ability to steer their sales force's actions in the most effective way and improve performance.

Boosting sales and pricing performance based on detailed and real-time market and customer insights

These hurdles represent substantial and interconnected challenges that hold back many chemical companies' ROS performance. We have found that the four-step approach described below can help companies tackle them and improve performance.

Chemical companies that have adopted this approach have achieved substantial improvements in ROS, with the degree of improvement depending on their starting point and on the type of business they are in. Companies mainly selling commodities in the spot market have seen ROS improvements of 2 to 4 percent, while companies that sell primarily through individual customer negotiations have captured improvements of 3 to 6 percentage points of margin; companies that sell customized products and solutions have achieved ROS improvements of between 5 and 8 percentage points of margin. In some very selective special-product and service cases, ROS improvements of as much as 20 percentage points of margin have been captured, but this requires a granular approach that allows players to identify niche products and services where they have a true competitive advantage and where they can implement value-pricing approaches to capture the full potential value of their offering. These ROS improvements have typically been achieved within two years—and in some cases as quickly as within nine months.

1. Discovering the sales portfolio's true profitability

The first step that enables chemical companies to make improvements in pricing and sales execution is to establish full transparency into the factors that drive the profitability and growth of geographic regions, product lines, and individual customers and transactions. The analyses that must be carried out include the profitability of customers by volume and segment, price performance and profitability across micromarkets, and changes over time with regard to margin, volume, and churn by customers and segments (exhibit).

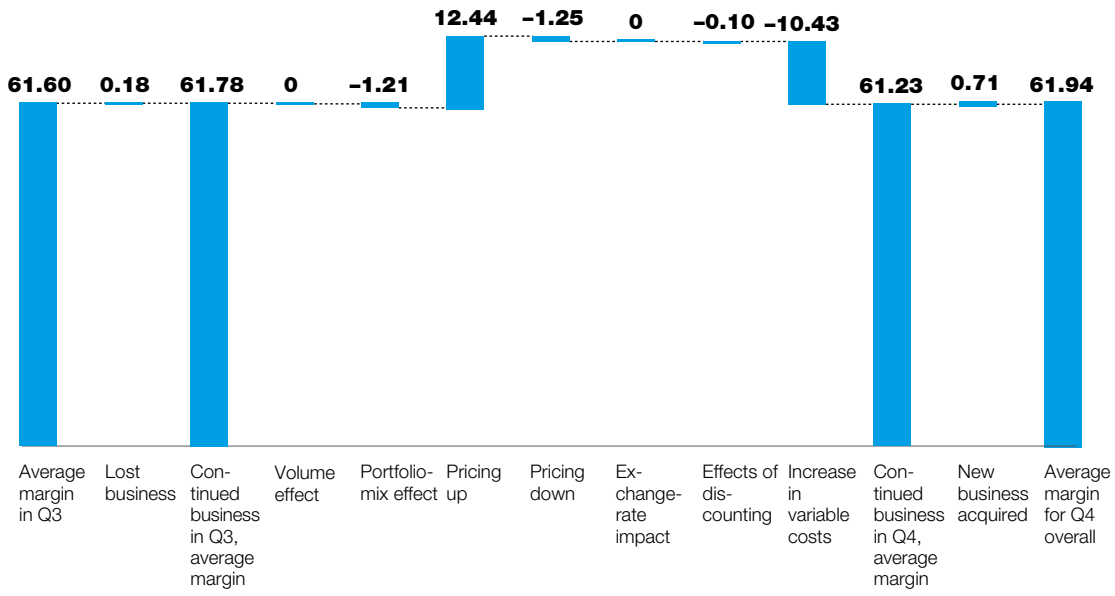
Factors that should be examined include the more obvious, such as sales prices, and the less apparent, such as "cost to serve"—in other words, companies should make a full assessment of all the costs associated with supplying a customer. Many of these costs are not immediately visible. It is important to identify customer behaviors that impose additional costs but that are not captured in ERP-based information. For example, a customer might make last-minute changes to an order that result in the chemical company incurring additional but hidden handling and logistical costs. Similarly, some customers make

Exhibit

Achieving transparency into the drivers of profitability opens the way for performance improvements.

€ per kilogram

Contribution margin per unit, Q3 2009—Q4 2009



Source: McKinsey Periscope Platform

extensive use of companies' laboratory services and technical support, but these additional costs are often not reflected in the prices charged to them.

It is also important for senior sales management to enforce a standardized approach to measuring account profitability across geographies. Frequently, different national sales organizations apply different metrics. These national differences make it difficult to effectively manage performance across regional or global markets.

Building on this, companies can conduct further analyses on price performance and profitability for individual customers compared with the total portfolio, examine price leakages from gross price to net price and then to contribution margin, and look at cost to serve and leakage for different customers. These analyses provide a wealth of insights on the true levels of profitability of the company's businesses, and they can inform targeted pricing actions to capture the profitability improvement potential.

2. Pricing to maximize value capture on each transaction

Once the company has gained insights into profitability, it can start to address its sales performance, and here pricing is a top priority. The first area on which to focus is setting pricing guidelines. These guidelines are created by devising action plans for certain customer or product groups; such action plans include deciding on target profitability levels and price points.

For example, if a company identifies that profitability at its small customers is too low because of the additional complexity entailed in appropriately serving this segment, it should reset its profitability targets for the segment in a way that reflects the cost to serve, customer price sensitivity, and its competitive positioning. New pricing guidelines, as well as go-to-market and service-level guidelines, should also be established to reflect these profitability targets.

Companies can also use guidelines to steer the sales force to capture premium pricing on products if it is merited. For example, one specialty-chemical company had a product with distinctive characteristics that provided benefits in certain end-use markets that the company knew gave it the opportunity to charge a higher premium in those markets than in others. The company created guidelines for the sales force to capture that premium on the product in the particular application, backed up by differentiated branding of the product. It also started to educate its salespeople about where to look for this type of value-pricing opportunity.

When setting such guidelines, we have observed that one effective approach is for companies to simulate the impact of their price-setting actions. This allows the company to model changes in raw-materials and other costs and then enter prices for a region, country, customer group, or product line. In this way, it can see the impact on ROS coming from each change. A company that produces surfactants, which found that its ethylene oxide costs were increasing, was able to model how much it would need to increase prices to maintain its margins and then set pricing guidelines accordingly for its sales force.

3. Steering the sales force to get the best possible deal

The third step focuses on sales execution. This is an area where some chemical companies need to improve, particularly when preparing their sales representatives for negotiations with customers.

We have observed that while chemicals sales representatives are good at the traditional skill of securing sales volumes, many cannot negotiate confidently with their customers' procurement departments to secure price increases. Many reps also lack the analytical skills to deal with sales data. Given that chemical companies are selling to many industries that have taken steps in recent years to strengthen their procurement departments, this puts chemical suppliers at a disadvantage. Sales representatives must be trained to look for ways that they can work with colleagues in their operations, freight, and finance departments to fine-tune the offering that can be provided to the customer, closing leakages and tying up loose ends to improve service.

An effective approach used by some best-practice companies is to provide the sales force with a tool for quoting prices in real time, which arms the salesperson to get the best possible deal from the customer. The tool's algorithm incorporates pricing guidelines and supports the salesperson in finding the deal terms that capture the maximum value based on the supplier's distinctive position; it also includes the surcharges needed to cover specific delivery and product-quality requirements for the customer. Additionally, the tool gives the salesperson information—for example, on different price, volume, and delivery-term packages, and on margin—to be able to propose deal alternatives. All of this puts the salesperson in a position to negotiate confidently with procurement departments.

At the same time, sales management can use the tool to monitor sales reps in the field and maintain an ongoing dialogue on sales performance, reinforcing its intended messages. The historical data that the tool collects can also show sales management which customers and salespeople to focus on, for example, directing a salesperson to push volume sales in an area where price increases have been going through easily.

4. Establishing an integrated performance-management system across the sales process, from the CEO to the salesperson in the field

Many chemical companies steer their sales efforts based on volume and on a superficial view of the contribution margins that they earn, but this represents a relatively crude instrument for steering the sales organization. Once the steps outlined above have been taken, best-practice companies put in place performance-management systems that establish consistent key performance indicators (KPIs) for all their commercial activities. Such systems go into a high level of detail, and the results are then consolidated into a single reporting system. While companies often have different KPIs covered in different reports, an integrated system makes it possible to track everything in one consistent way. Management can monitor overall pricing performance and individual customers' performance against targets, identifying the best- and worst-performing accounts and products—the information is all at their fingertips in one system.

This kind of performance-management system also transforms sales-force mind-sets. Traditionally, performance dialogues with salespeople have focused on activities and volumes. With the new system, KPIs are aligned with the goals of the sales organization and the sales staff, and it becomes possible, for example, to monitor whether a salesperson captured the target price set for an account. This more comprehensive system with new KPIs can provide regular feedback to support more effective performance dialogues with the sales team—discussions that are focused on issue resolution.

Beyond performance dialogues, the management system provides a generally more effective way for the company to steer the efforts of its sales force.

Moving to higher ROS performance: Success stories

Once these four steps have been taken, we have observed that companies are able to make substantial improvements in ROS performance. Consider the initiatives taken by two chemical companies. The first, a diversified global chemical company with a 500-person sales force, had been contending with declining ROS performance for several years. This could be partly attributed to increasing competition from new suppliers in low-cost countries, but business segments not affected by such competition were also in decline. The company embraced the approaches outlined and applied them to its commercial operations; within 24 months, each of its business units experienced improvements in ROS of 2 to 5 percentage points.

In the second case, a European petrochemical company lacked full transparency on profitability levels in certain customer segments and channels. The transparency that was achieved using the approach we have described showed the company that it could earn better returns by selling directly rather than through distributors for parts of its business, and demonstrated that it should enforce new price guidelines for selected customer segments. Within six months, ROS had improved by more than 5 percentage points in the targeted segments and channels.

Our experience has shown that when applying this four-step approach, the greatest benefit to senior sales management comes from the analysis of a limited number of key indicators that have the highest impact on ROS performance. We have developed Periscope, a platform that provides tools and this type of focused information to support pricing and sales execution. Additional information is available at https://solutions.mckinsey.com/catalog/periscope.html and from the authors.

Companies should also look at the potential that can be achieved by integrating this pricing and sales-execution approach with a broader set of improvement initiatives that cover all the important dimensions of the commercial process. These initiatives include attending to organizational setup and pricing processes, as well as looking at how the company works across its different functions to resolve pricing and margin-management issues. The initiatives also cover capability building for sales management and frontline sales staff. This is a multiyear process, but it can allow a company to capture significant additional margin independent of the chemical-industry business cycle, as well as to make silo-breaking, cross-functional improvements that can carry company performance to a higher level.

Joel Claret (Joel_Claret@McKinsey.com) is a director in McKinsey's Geneva office, **Dieter Kiewell** (Dieter_Kiewell@McKinsey.com) is a director in the London office, **Soenke Lehmitz** (Soenke_Lehmitz@McKinsey.com) is a principal in the Berlin office, and **Prashant Vaze** (Prashant_Vaze@McKinsey.com) is a principal in the Antwerp office.

Kick-starting organic growth

Even in a recovering economy, many companies see only limited potential to boost revenues and profits through organic growth. But there is a larger opportunity to capture: by targeting micromarkets and reorganizing the sales force to prioritize growth, companies can achieve growth rates well above the overall market.

Maximilian Coqui, Manish Goyal, Jason Grapski, and Soenke Lehmitz

Chemical companies face two challenges when seeking to grow organically in seemingly saturated and highly competitive markets. First, many companies have trouble finding opportunities. Second, even if they identify new areas to pursue, they find it difficult to motivate their sales forces to break old habits and take initiative. But while it is not easy to find growth opportunities in such markets and transform the sales force, companies should not give up.

Extensive McKinsey research shows that re-examining markets at a more detailed or granular level reveals large numbers of micromarkets that present substantial organic-growth opportunities well in excess of overall market-growth rates—opportunities that are hidden when a more generalized or average view is taken of the larger market.[1] This is as true for the chemical industry as it is for other industries and markets.

Why do chemical companies frequently fail to see these potential growth markets and translate them into new sales? One part of the problem is that some companies do not do enough homework on market prospects and are not keeping up-to-date on the shifting customer base, notably when selling into fragmented and changing markets. As a result, companies lack insights, in any particular geography, into where the fastest-growing and most profitable customers might be.

[1] See Mehrdad Baghai, Sven Smit, and Patrick Viguerie, *The Granularity of Growth*, Hoboken: John Wiley & Sons, 2008, and Baghai, Smit, and Viguerie, "The granularity of growth," *McKinsey Quarterly*, May 2007, www.mckinseyquarterly.com.

The second and related part of the problem stems from how companies handle their sales forces. In the mature markets in which most chemical companies in developed countries operate, salespeople tend to have routine ways of looking at and dealing with their customers. Directives from the top to prioritize new market segments often get lost in middle management and are not transmitted to the sales force, and when they are, salespeople do not know how to follow through.

The result is sales-force-led prioritization of customer development based on the ease of winning the customer, rather than an approach built on prioritizing customers based on their potential contribution to profitability. Making matters worse, many companies do not use an incentive system that rewards sales staff for seeking new growth accounts.

Not surprisingly, senior-management teams at many chemical companies in developed economies view grappling with these challenges as offering little growth. They see rallying their sales forces once again to fight for gains in this familiar territory as unrewarding trench warfare. Instead, many senior teams prefer to focus on the seemingly more exciting prospects in M&A and on investments in fast-growing emerging economies.

However, in the chemical industry—as in a number of other industries—some companies are starting to show impressive results from a new approach that turns these shortcomings around. In chemicals, companies that operate in highly fragmented specialty markets comprising large numbers of customer niches have been particularly successful using this approach.

The approach, Micromarket Management (M3), has two main components. First, it adopts a granular lens to target micromarkets and pinpoint growth opportunities. Second, it focuses on actionable steps at the sales-force level: building strategies to pursue micromarket growth, boosting sales-force effectiveness and providing incentives for the sales force to pursue growth, and strengthening underlying commercial capabilities.

Defining and grouping micromarkets

For many senior managers in chemical companies—in particular, those that serve a market sector growing in line with GDP in which multiple competitors are entrenched—the key question is where to find areas of growth. Getting to the right answer can be a major challenge for companies with hundreds or thousands of customers. For companies that have succeeded with this approach, the first step is to break the market down into manageable subgroups—or micromarkets—where the prospects can be reviewed in detail. Such subgroups can be based on shared characteristics—notably, scale, type of industry, or degree of service intensity—or simply on geography. One specialty-chemical company, for example, sorted its markets into geographical regions and then grouped customers and potential customers within each region by industry type.

Once the micromarket segments are defined, these companies evaluate the growth potential of each micromarket—both with regard to the level of penetration the company has already achieved and the additional share that it can aspire to capture—and of the market's underlying growth or lack thereof. This can provide surprises. For example, one chemical and services company with

a 20 percent share of the overall market discovered it had share as high as 60 percent in some markets, while in others, including the fastest-growing market, its share was as low as 10 percent. Companies also assess the competitive dynamics in the micromarket, such as the number of competitors and whether pricing in the market tends toward value-based practices or is just aggressively cost-based (Exhibit 1).

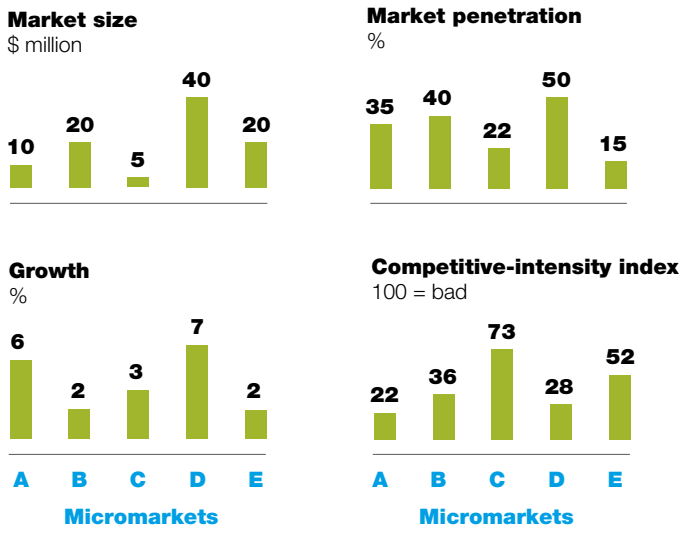
A typical micromarket-definition exercise can generate dozens of micromarkets—or even hundreds if the company considers an entire continent. To avoid becoming bogged down in the complexity of handling numerous micromarkets, successful companies combine micromarkets with similar characteristics (including growth opportunities) into a much reduced and manageable number of "peer groups," and then define a strategy for each peer group. In most chemical sectors, that number is no more than 8 to 10 peer groups in each of a company's main regions.

For example, a company specializing in inputs for the agricultural sector (including crop-

Exhibit 1

Companies can use internal and external customer data to assess current performance and identify attractive micromarkets.

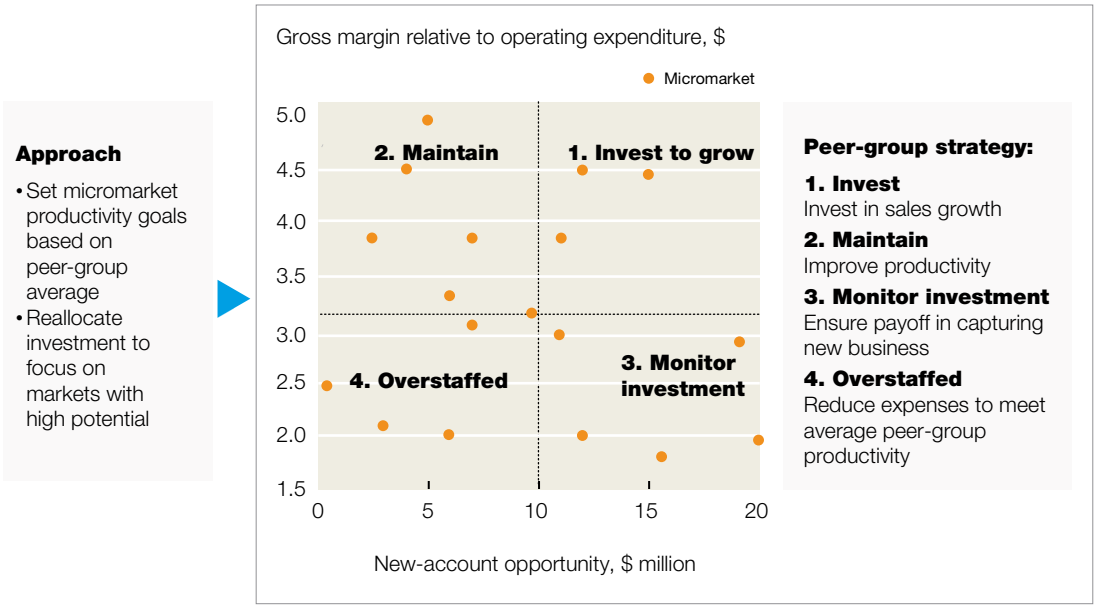
The attractiveness of growth areas becomes more nuanced when examined at the level of micromarket data



Source: Disguised client data; McKinsey analysis

Exhibit 2

Define peer groups and assign strategies for the micromarkets making up each peer group.



protection chemicals, fertilizers, and seeds) aggregated its 200 micromarkets in the United States to 10 peer groups. These peer groups were built based on the characteristics of the farms that they were serving. Factors that were taken into account while building these peer groups included the size of the farms, the relative density of the farms in a geographic area (for example, farms in the west were larger and more spaced out than those in the east), and the type of product ordered by each of the farms.

This aggregation to a limited number of peer groups is an essential step in ensuring that the micromarkets exercise can be translated into an actionable sales-development plan for the company. As will be explained in more detail, the peer groups can also be used to share best practices across the sales force and to compare different sales representatives' performance.

Building strategies

The next step is for the company to develop strategies for its peer groups, which can then be tailored for each micromarket. In one example, a chemical company grouped its 18 micromarkets into four peer groups and outlined four related strategies, including "invest," in which the company sought to capture an

outsize share of growth, and "maintain," in which the company's strategy was to hold on to its market share while maximizing operating efficiencies (Exhibit 2).

Developing the strategic plan involves taking into account which micromarkets to focus on based on growth potential and defining how to capture the potential and to meet or exceed market growth. This results in a detailed plan that covers sales-force allocation and in-market capabilities, performance goals related to capturing new business and retaining old business, briefings to the sales force on how to approach new types of clients, pricing, and an implementation program.

District managers translate the strategy into specific tactics for sales reps to use: for instance, identifying which accounts to pursue and how much time should be allocated to each. A company's pricing policy should reflect micromarket opportunities, as well as the customer life-cycle stage and purchase histories that predominate in the micromarket. In addition, marketing strategies should be sufficiently tailored to provide a distinctive product or service suited to the traits of a given micromarket. For one chemical company, adopting this peer-group and micromarket-strategy approach resulted in a tenfold increase in prospects—identified potential opportunities—in some micromarkets and a narrowing down of realistic prospects in others (Exhibit 3).

A key piece of the strategy is undertaking detailed research on the best prospects in the prioritized sectors. One specialty-chemical company redeployed some sales-force resources to create positions for market-prospect researchers. These individuals scan data from external resources and tap into information gathered by the sales force in the field. This keeps the company's information on growth prospects fresh—and hopefully ahead of its competitors' insights. With this enhanced resource in hand, the company made a scan of potential hospital client prospects, analyzing details down to the number of beds in every hospital across a country market.

Adding the sales-force-effectiveness dimension

The next step is to ensure that the sales force is allocated and provided with incentives in ways that are aligned with the strategies developed for the micromarkets. Having an accurate view of the performance and capabilities of the sales force enables the company to act effectively on the leads created by the new micromarket data, so that it can match the best salespeople with the best opportunities.

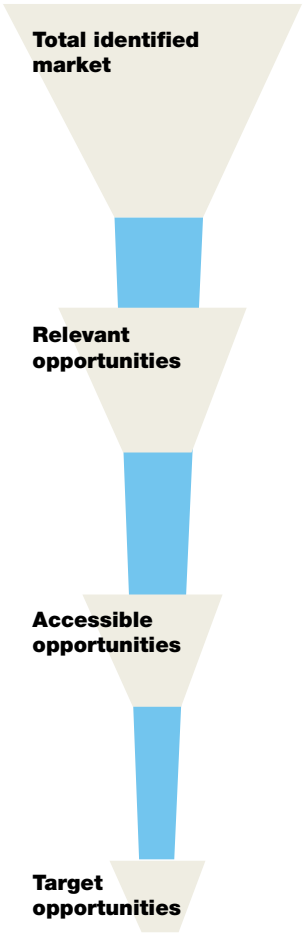
Some best-practice companies monitor how much time each salesperson has been spending with each account and conduct a "skill/will" assessment of all sales and service reps, including their account conversion and retention performance. In one company, district managers completed evaluations to assess each rep's skill and will for new-business sales. Coupled with prior performance data (including new-account growth, retention rates, and so on), this evaluation was used to identify the role on the sales force that each sales rep should be assigned to. The chemical company evaluated each of its 3,000 sales and service reps worldwide.

Companies can then use the new understanding of each micromarket's relative opportunity in combination with each rep's skill set to re-

Exhibit 3

Companies should develop a comprehensive view of tangible customer opportunities within each micromarket.

Apply a robust process to identify and prioritize opportunities in each micromarket …



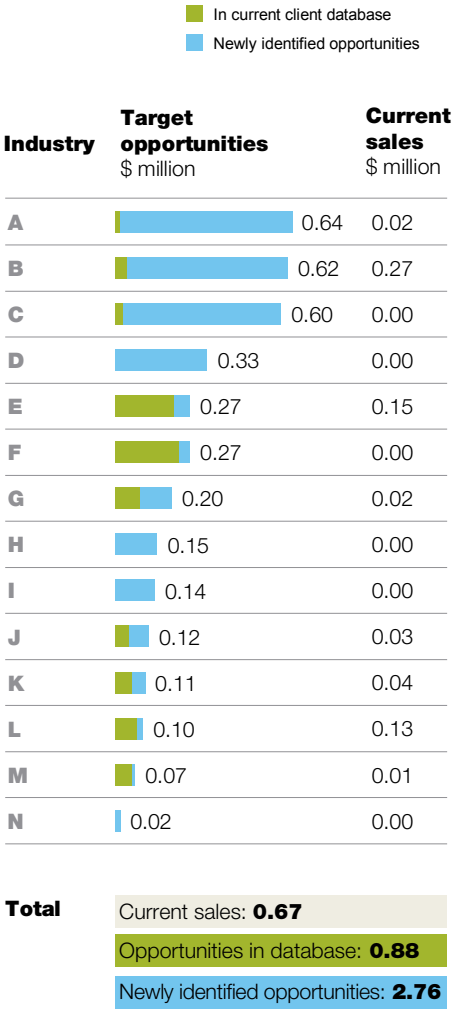
- Investigate any account site that purchases the client's products
- Search more than 50 global and local databases
- Identify more than 5,000 accounts per microdistrict across 65 industries
- Identify exact locations and calculate value per account

- Examine opportunities the client is interested in approaching in the midterm but currently lacks the capabilities to address

- Identify opportunities where the client has the right offering but economics do not justify immediate pursuit (eg, small accounts, low-margin accounts)

- Target opportunities that are an immediate priority and will be assigned to specific sales reps

… and significantly increase the world of opportunities for reps to pursue



Source: Client financials; external trade publications

One company not only doubled its rate of growth over an 18-month period but also reduced costs 5 percent, since it was able to deploy its sales force more efficiently

allocate sales resources. This should result in reps skilled at gaining new accounts ("hunters") spending their time aligned with the opportunity for generating new business, while reps skilled at maintaining existing business ("farmers") concentrate on those accounts. This approach improves sales growth and reduces waste of sales resources. At one company, the analysis showed a top-performing "hunter" was traveling 200 miles and spending 55 percent of his time in an area where it now appeared that only 25 percent of the opportunity existed. His workplan was reorganized and his home base was moved so that he was traveling only 50 miles and spending 75 percent of his time in an area where 75 percent of the opportunity existed.

The company also developed customized pricing and sales tools that could be adjusted depending on strategy. As a result, new customers in an "aggressive growth" micromarket received lower prices than customers targeted for service renewals in "moderate growth" micromarkets.

In another example, the agricultural-chemical company conducted a detailed analysis that plotted market share against sales coverage. This analysis helped the company identify coverage levels (or "bands") and calculate average market share to understand the point of diminishing returns. These data were then used to set aspirations. For each micromarket, the client made an explicit decision on whether it wanted to get the most possible share points from added coverage or only increase coverage where "bang for the buck" was the largest.

Successful companies have also established improved performance-management systems. These include defining new pricing and service guidelines across accounts to ensure that all accounts are held to a minimum level of profitability. With regard to sales-force performance, best-practice companies have created incentives for the sales force to pursue the newly identified growth opportunities and to look out for new growth opportunities. They do this by evaluating the sales reps on leading indicators, such as how often they call prospective customers and top-performing "hunter" reps' increases in sales time, and on lagging indicators, such as new-account generation and sales growth.

Again, the peer-group structure can play a valuable role here. Companies can measure per-

formance within peer groups of similar micromarkets, replacing the typical practice of simply evaluating an individual market's and salesperson's performance against a set of key performance indicators. This approach makes it easier to spot major performance gaps and to validate hypotheses about the effectiveness of micromarket strategies and changing market conditions. In addition, the peer-group perspective can be used to share best practices across the sales force and to compare different sales representatives' performance.

Building the supporting organization to drive and sustain the change

In the third phase, successful companies build up the commercial capabilities required to execute their micromarket strategies. When assigning roles and responsibilities, we have observed that companies tend to standardize some duties but also allow for a degree of modification across micromarkets.

In addition, the need to build up certain capabilities to be able to pursue micromarket opportunities is often recognized when pursuing this approach. Rather than adding overhead to build capabilities, best-practice companies reallocate resources. One specialty-chemical company shifted staffing allocations from lower-priority sales territories to set up a new sales-operations group to monitor its progress in each of its regions (Americas, Europe/Africa/the Middle East, and Asia-Pacific). It also put in place a marketing analyst to identify and track opportunities across one region and added a second analyst to prepare financial tools for real-time decision making in each micromarket. This included building maps and assigning reps to accounts in close proximity, as well as changing time allocations to focus on more profitable accounts and more sales (rather than service) activities.

Impact

Using this approach, one chemical company doubled its rate of growth over an 18-month period while maintaining upward price momentum. It did this primarily by identifying its largest opportunities and then assigning sales reps to capture them. The growth rate achieved was three times higher than that of the underlying market, which mirrored the region's GDP growth. The company also reduced costs by 5 percent, since it was able to deploy its sales force more efficiently, giving top sales reps more time for face-to-face selling instead of servicing accounts.

Another chemical company turned around a decade of market-share losses after implementing this approach. The client had lost a point or more of market share for 10 successive years and failed to capitalize on a booming market. After launching this effort, the client was able to hold market share steady for the first year; it has increased share by two to three points annually for each of the past three years.

This approach has had significant impact in industries beyond chemicals as well. A large air-cargo operator was able to double the share of wallet from key strategic customers along targeted trade lanes by following this approach. Similarly, a logistics player was able to grow volume and price simultaneously, increasing revenues by 3 percent. In another case, a leading Asian mobile operator whose annual revenue growth had declined by 50 percent over two years

used the approach and is now on track to realize revenue growth of 5 percent.

To support companies in the initiatives described above, we have developed a framework and a number of tools, which are available as the M3 approach. The M3 offering includes templates that can be used in micromarket analyses, frameworks for aggregating micromarkets into peer groups, and a number of sales-support tools.

The approach outlined in this article makes it possible for companies to generate new market insights by combining granular micromarket data on growth prospects with specific and actionable steps that the sales force must follow. Chemical companies that have adopted the approach have seen impressive organic-growth improvements. Consider the alternatives: M&A has a high failure rate. Expanding in emerging markets is expensive and requires extensive new skills, while innovation—though a well-tested route to growth in chemicals—takes time and luck. Given all that, chemical-industry senior-management teams should look carefully at organic growth as a route to building their businesses and improving returns to shareholders. They should also bear in mind that if they are not paying sufficient attention to and defending their core business, they may well lose it to a competitor—one that is willing to invest the time and effort necessary to build it up.

Maximilian Coqui (Maximilian_Coqui@McKinsey.com) is an associate principal in McKinsey's Munich office, **Manish Goyal** (Manish_Goyal@McKinsey.com) is an associate principal in the Dallas office, **Jason Grapski** (Jason_Grapski@McKinsey.com) is a principal in the Southern California office, and **Soenke Lehmitz** (Soenke_Lehmitz@McKinsey.com) is a principal in the Berlin office.

February 2011
Designed by McKinsey Publishing