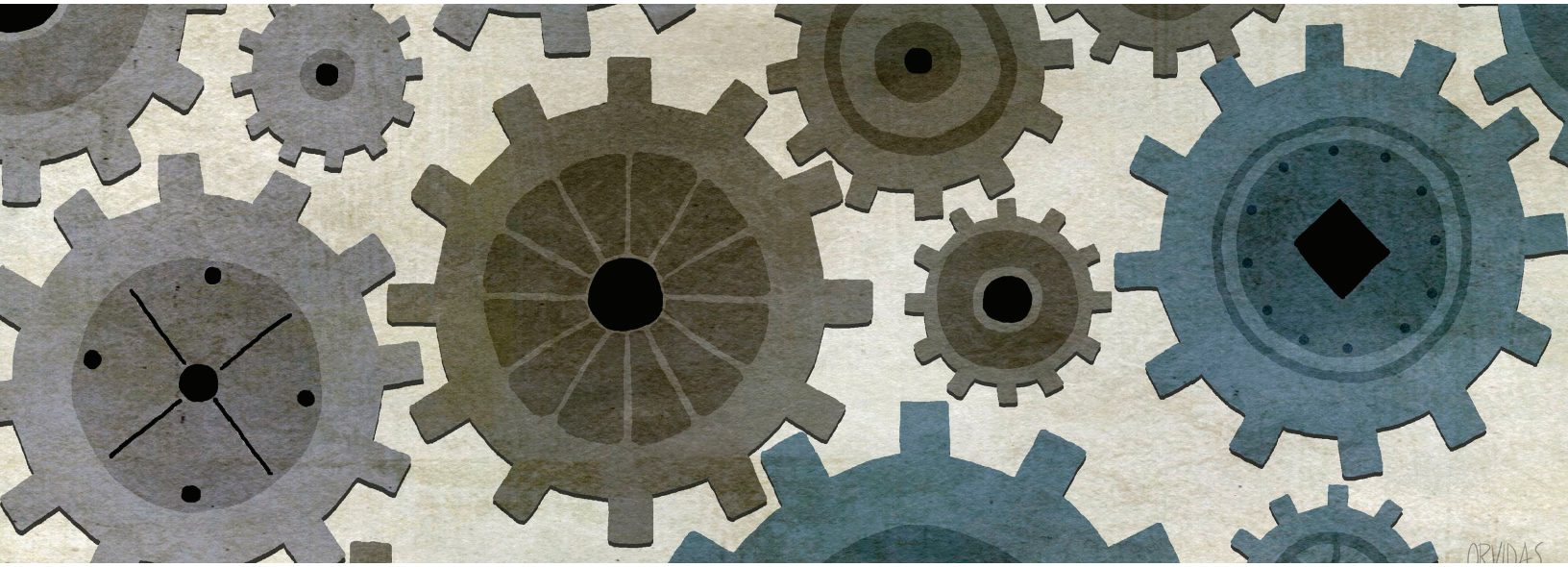


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CHEMICALS & AGRICULTURE

Pursuing purchasing excellence in chemicals

While chemical companies recognize the importance of strong purchasing capabilities, few have transformed the function into a source of strategic advantage. Here's how they can.

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Obtaining raw materials at the right price, specification, quantity, and quality is fundamental to the profitability of chemical companies. Purchasing expenditures are equivalent to 20 to 60 percent of sales revenue for specialty-chemical players and 50 to 80 percent of revenue for makers of commodity products. It isn't just the size of purchasing spending that makes it so significant for chemical companies. The return of severe raw-material pricing volatility—with oil prices down by over 50 percent from two years ago—means that making the right purchasing decisions matters more than ever.

An increasingly global market for raw materials has developed since 2000, giving chemical companies a broader choice of price and grade for many commodities, albeit with important implications for lead times and transportation costs. This supply continues to evolve, with new resources such as output based on low-priced US shale gas coming to market.

On the demand side, many companies face increasing complexity as their customers request niche products to suit particular end uses or to meet diverse local regulations—and this affects what they need

to buy. In addition, players must find ways to profitably operate their asset-heavy and inflexible production systems.

A purchasing-improvement initiative can make a substantial contribution to better financial performance. Reducing overall spending by 6 to 10 percent (a reasonable goal if spending is 50 percent of sales, based on our observations in the sector) can deliver a boost of three to five percentage points in earnings before interest and taxes (EBIT).

Good but not yet great

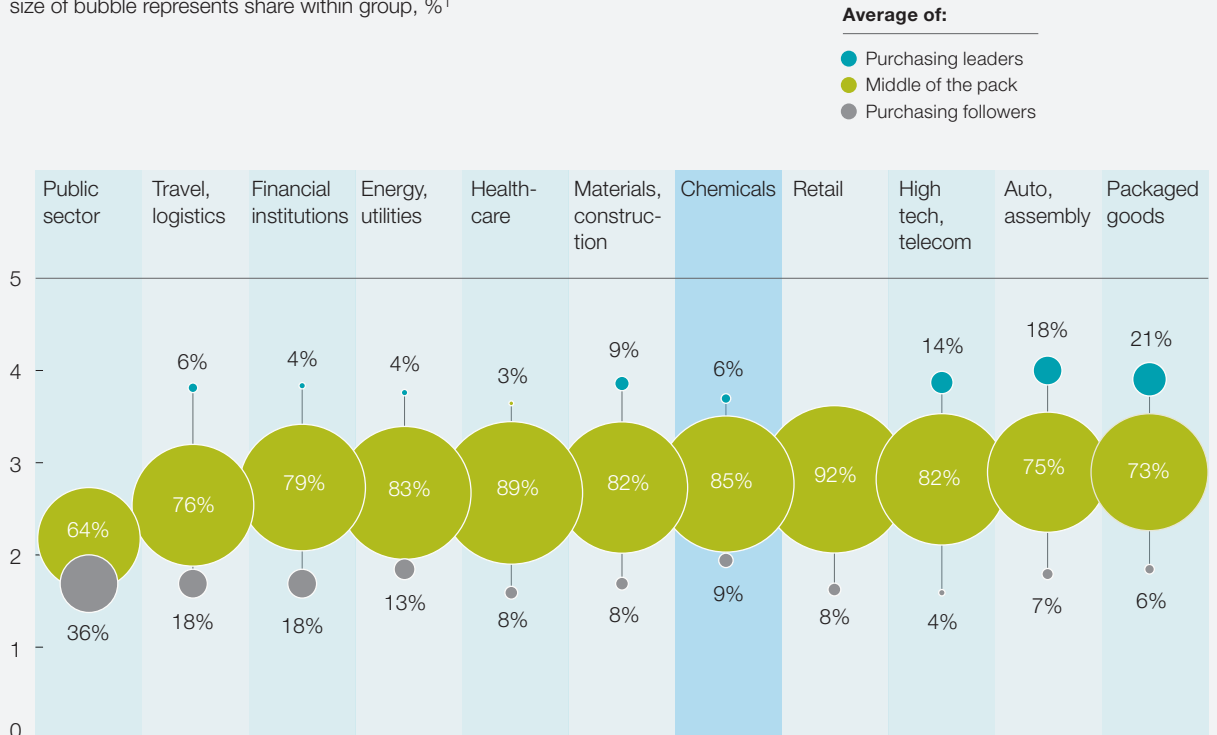
With so much value on the table, it is no surprise that the chemical industry has developed stronger

purchasing capabilities in recent years. But there is room for further improvement. In our global purchasing-excellence benchmark, for example, the chemical industry scores an overall average of 2.6, putting it in the top half of industries in the study (Exhibit 1).

Perhaps more telling than the average performance figure, however, is the spread. While 85 percent of the chemical companies studied demonstrate solid middle-of-the-pack performance, only 6 percent of them appear in the ranks of true purchasing leaders for the overall sample. This suggests that fewer than one in ten chemical firms have taken the next step in purchasing performance: turning

Exhibit 1 While the chemical industry shows good overall procurement performance, few companies have made purchasing a strategic weapon.

Average purchasing practice score (scale: 1 = low to 5 = high),
size of bubble represents share within group, %¹



¹Figures may not sum, because of rounding.
Source: McKinsey analysis

their purchasing functions into a source of sustainable competitive advantage.

Chemical complexities

There are sound reasons why fewer companies in the chemical sector have achieved purchasing excellence compared with those in the automotive, high-tech, and consumer-packaged-goods industries. While there are common approaches to optimize indirect spending in most industries, direct spending in chemicals presents two particular challenges.

First, the products are complex. For a commodity-chemical player, 10 or 20 products may account for half its overall spending. That might seem like a straightforward buying proposition, but this is deceptive. Each product may be available from multiple locations and be supplied in several basic forms and numerous grades. In addition, relatively small changes in the characteristics of these inputs can lead to big shifts in the cost of processing them into finished products. That makes chemicals a tough environment to make optimal purchasing decisions in, and it requires purchasers to have deep knowledge of the technical and supply-market intricacies of their categories. Despite this complexity, the pricing of many chemical commodities is largely driven by indexes, making procurement appear simpler than it really is and discouraging companies from investing in the expertise they need.

Second, there is the long tail of lower-volume products. Chemical players, particularly in specialties, may use thousands of additives to fine-tune the characteristics of their products to suit customer needs. Some additives may be used rarely or in tiny amounts, but they can be fundamental to the performance of the end product. Similarly, companies may have to supply products in hundreds of different combinations of packaging and labeling. Even when achieving better purchasing value in these categories is straightforward (and often it is not), to do so can present a formidable workload for purchasing teams.

Because of these complexities, companies tend to limit their purchasing-improvement efforts. These efforts typically include classic procurement levers, such as

bundling products with fewer suppliers to capture economies of scale and negotiating aggressively to push prices down.

The road to excellence

The most successful chemical companies, regardless of size, sector, or geography, take a different tack. First, they segment purchasing categories according to value and strategic importance. Second, they use a comprehensive approach to purchasing optimization that goes far beyond the traditional levers just mentioned.

Chemical companies that get this right can capture substantial gains. Our data on more than 500 chemical-industry commodities show typical savings from adopting best practices in procurement that range from 1 to 5 percent for base commodities to 10 to 20 percent for fine and specialty chemicals. In indirect categories, the savings potential can be even higher—as much as 30 percent in facilities management, IT and telecommunications, or office supplies, for example.

Segmenting by category

Purchasing excellence starts with a thorough segmentation exercise to identify the products that are strategic and critical to the company's operations (Exhibit 2).

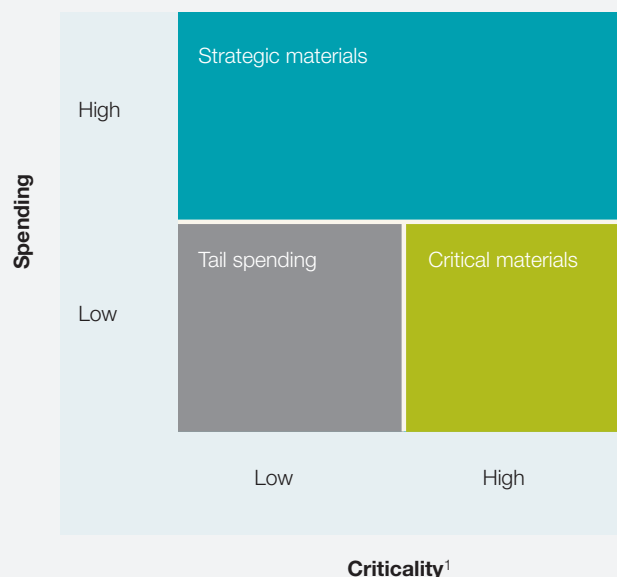
In most cases, strategic materials comprise a small number of commodities that represent a large part of the company's annual spending. Critical materials are products on which it spends less, but are critical by nature of their importance to the company's end products and the risk of supply disruptions or price volatility. For example, a limited supplier base may present possible availability issues.

Companies can then adopt a different approach for the tail. This comprises the remaining products that are lower volume and less important; the supply of these is often best dealt with by being handed off to distributors.

Taking a comprehensive approach

For strategic and critical materials, best-in-class companies deploy a comprehensive approach to purchasing optimization that includes three elements.

Exhibit 2 Companies can segment their spending.



¹This depends on number of suppliers, relevance to end product, stability of technology, availability of substitutes, and so on.

Commercial levers

Most chemical companies use contract and supplier management as their main lever when buying important direct materials. Best-in-class companies bring some additional elements to the mix. They are rigorous about renegotiating supply agreements when major changes occur, such as recent oil-price declines, and they are careful to define contract terms that control price-volatility risk.

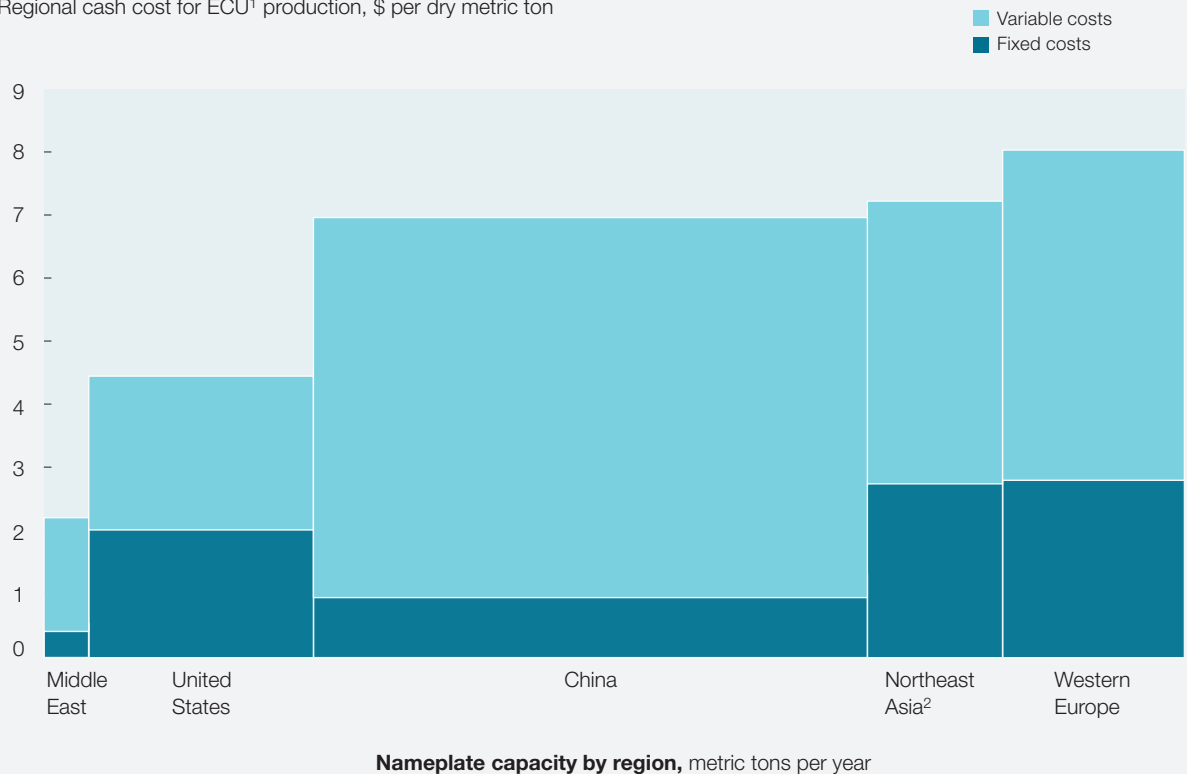
But perhaps most important, they reinforce their traditional commercial capabilities with a comprehensive and up-to-date fact base and strong analytical skills, which give them a deep understanding of suppliers' true costs and how changes in the market will affect their purchases. The result is that their negotiating teams rely less on strong-arm tactics and more on identifying the real opportunities for the supply of materials at lower overall costs.

Such a fact base starts with an understanding of the global marketplace of the chemical product in question. The price of chemicals can vary dramatically from region to region depending on the quality and availability of raw materials, the price of energy, local demand, and the production capacity in that area. Cost curves, like the one shown in Exhibit 3 for caustic soda, can reveal the locations best placed to provide sufficient volumes of the desired product at the most attractive cost and can provide insight into price and availability development. For caustic soda, the Middle East and the United States have the lowest costs at present (in the case of the United States, this is largely due to the availability of cheap shale gas). The greatest volumes in the market are in China, however.

This chart also hints at the way relative cost advantages can change dramatically. Low energy costs may promote a wave of investment in new capacity in the

Exhibit 3 Dynamic global cost curves help buyers understand price-setting mechanisms and arbitrage opportunities.

Simplified global caustic-soda production cost curve,
Regional cash cost for ECU¹ production, \$ per dry metric ton



¹Electrochemical unit, the ratio of production of chlorine, caustic soda, and hydrogen from electrolysis of brine.

²Japan, South Korea, and Taiwan.

Source: McKinsey analysis

United States in the next few years, for example, and scale and technology advantages may help to widen the cost gap. Understanding the dynamic nature of the cost curve helps companies plan their purchasing strategies for medium- and long-term advantage, for instance, by building relationships with suppliers in regions where costs are falling.

Prices can fluctuate predictably over the short term, too. Sometimes seasonal demand from other industries

for a commodity can push up prices at certain times of the year, creating savings opportunities for companies that can use more of the material during periods of low demand.

Changing supply-market dynamics make it important for companies to understand the way the supply base in key commodity groups is evolving. New suppliers frequently enter the market, aiming to capitalize on rising demand in a region or on local production-

cost advantages. Best-in-class companies take a systematic approach to gathering of market intelligence on current and new market participants. By understanding the investment plans of these suppliers, as well as the changing conditions in their major markets, they often can identify new sources of savings.

Even within regions that are well placed to provide a commodity, differences in suppliers' scale, technology, plant utilization, and business strategy can lead to substantial differences in their costs. Clean-sheet cost models are an effective way for companies to build an understanding of suppliers' underlying costs (see sidebar, "Clean-sheet cost models").

Once companies have identified opportunities to extract additional value, they need to capture it using a smart, structured approach to supplier negotiations. Preparation is the key to success here. Companies should develop a deep understanding not only of the category itself (often with the help of clean-sheet models) but also of the commercial relationship between the buyer and potential suppliers. Is the buyer a strategically important customer for the supplier, in this category or others? Do the two organizations have a track record of successful collaboration? Understanding how a potential deal looks through a supplier's eyes can help companies pick the right negotiation strategy.

Face-to-face negotiations may still be the best option in cases where spending is high, suppliers are few, or there are opportunities to improve value through technical changes. But in other situations, Internet technologies have increased the range of negotiation options available to purchasing teams in recent years. Companies may use electronic request-for-quotation, or eRFQ, systems to get one-time bids for commodities from a range of suppliers, for example, or may choose e-auction techniques in which multiple suppliers are encouraged to bid against one another in real time. For some chemical companies, the latter technique has proved effective in obtaining price reductions of 30 percent or more from incumbent suppliers. These techniques are best applied in markets where buyers have multiple supplier options, as we have observed they can damage long-term relationships with suppliers.

Technical levers

The leading companies also find opportunities to cut costs by focusing on technical levers. In many cases, changing the specification or grade of purchased products can deliver substantial savings, although it is essential when making such changes to understand the implications for total cost of ownership.

A deeper understanding of the production costs and capabilities of suppliers—often obtained with the help of clean-sheet models—can help to inform companies' decisions about the form and specification in which to obtain their key inputs. Obtaining some inputs in a dry state instead of as a solution, for example, often will reduce the weight and volume of the product, reducing transportation costs. If the drying process significantly boosts energy costs at the supplier, however, or if it creates extra handling and storage challenges after delivery, the total cost of ownership of the dry commodity may actually be higher than the bulkier liquid form.

Similarly, different material grades can have implications for supplier production costs, transportation, and use. Caustic soda, for example, can be obtained in solution at a variety of concentrations. Higher concentrations mean lower volumes, reducing transportation costs, but they also have a higher freezing point. A 20 percent caustic-soda solution will remain liquid at -22 degrees Celsius, for example, while a 60 percent solution must be kept above 50 degrees Celsius. This means high concentrations may require more costly insulated containers to prevent freezing during transport.

Chemical companies can adapt some processes to make use of quite different raw materials. For example, a company could adapt its production process to switch to whichever source is available at the lower price, as the food industry does for cane sugar and corn syrup. Similarly, companies can sometimes optimize product recipes by reducing the percentage of the most expensive materials in favor of cheaper ones. Such strategies need careful analysis, however, as the characteristics of alternative inputs may require compensatory changes to other inputs or to process parameters. But for companies that master

Clean-sheet cost models

Clean-sheet cost models, like the one shown in the exhibit, use industry data to create a picture of suppliers' likely production costs, based on plant technology, scale, and utilization, as well as on local raw material, energy, and labor costs. Together, these factors provide an idea of what the material should cost, allowing negotiating teams to get a better sense of suppliers' price flexibility.

Using clean-sheet cost models in a transparent way in negotiations can also help organizations identify ways to reduce costs collaboratively. If a supplier disputes a particular

input-cost element, for example, this may reveal that the supplier has an opportunity to purchase its own raw materials in a more advantageous way or to improve the overall efficiency of its manufacturing processes. Some leading chemical players have followed the automotive industry's example in dispatching their own lean-manufacturing specialists to help suppliers with process-improvement efforts.

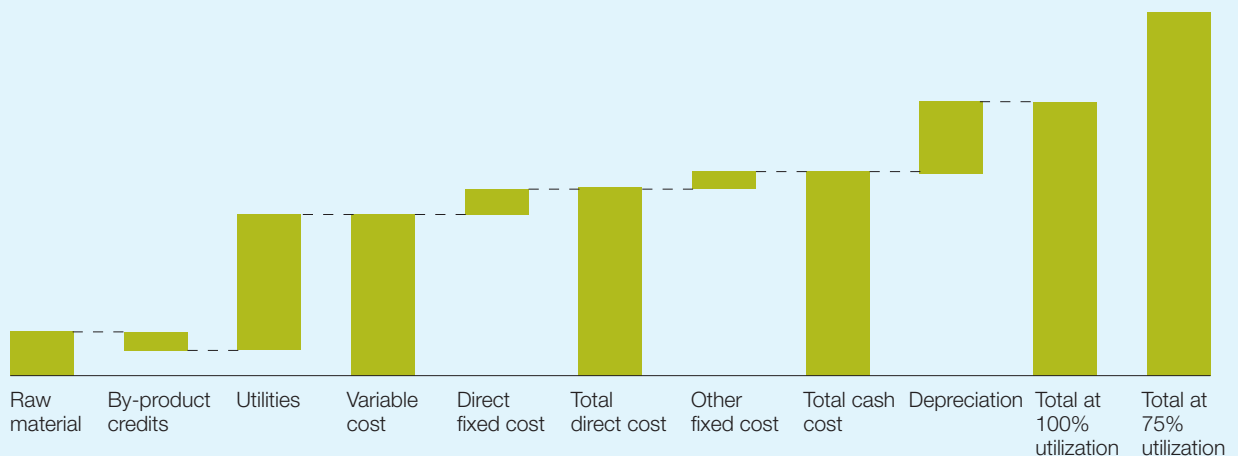
Similarly, clean-sheet models can help negotiating teams understand the supplier's sensitivity to fluctuations in input costs. In some cases, negotiating

contracts that account for these fluctuations can be advantageous for both sides—doing so, for example, could mean suppliers won't feel so much pressure to include a price buffer to protect themselves against rising input costs.

Using clean sheets in supplier negotiations is a two-way process. Companies can refine and improve their cost models based on feedback from suppliers. The better those models become, the more useful they will be in future negotiations.

Exhibit With a clean-sheet cost model, it's possible to determine the likely cost of a given material.

Illustrative model for chloralkali production,¹
\$ per 1.00 kg chlorine and 1.07 kg caustic soda



¹In chloralkali production, chlorine and caustic soda are produced at the same time; plant size 400,000 ton chlorine/year.
Source: McKinsey analysis

these complexities, the benefits can be significant. Some chemical players have even adopted a dynamic approach to material substitution, for example, continually modifying the ratio of certain inputs in response to price changes.

The choice of packaging and transport can make a big difference to logistics and supply-chain costs. For example, liquid products can be supplied in a wide range of containers, including flexible plastic bags, drums and bulk containers, or even road tankers, rail, and ships. As the volume of these containers rises, the relative cost of transportation drops, but the need for specialized equipment to unload, store, and handle the product on arrival also tends to increase. Buying in large quantities also has implications for inventory size and flexibility.

Finally, collaboration with suppliers can create value in a number of ways. One chemical company found that a supplier had the capacity to conduct an extra process step at its own plant before delivery. This change in the supply chain helped to relieve an important capacity constraint at the customer's plant. Other companies have worked with their suppliers to help them remove bottlenecks and implement cheaper, faster, or higher-quality production processes, and they shared the benefits.

Demand levers

The third set of levers that best-in-class companies use concerns their own production processes. Better coordination among sites or business units can often reveal significant opportunities for savings. For example, standardizing the specifications of finished-goods packaging at different sites can reduce the overall number and variety of containers purchased. Similarly, moving from local to central inventories of certain inputs can reduce requirements, if sites are located close enough to make this a practical option.

Harmonizing the specifications for a commodity can sometimes reduce costs with little or no impact on the process or end product. One company found that different business units ordered a key raw material from two suppliers with different concentration

tolerances. When the company analyzed the materials it received, however, it found not only that the cheaper material was suitable for most of its processes but also that samples of the material actually exceeded the tighter specifications.

The most significant way to shape demand can be deciding not to purchase a particular material at all. Alternative manufacturing technologies can accommodate different inputs, for instance, and potentially allow an organization to substitute a lower-cost ingredient for a higher-cost one. Such changes may require investments in new equipment, however; any such substitution decisions will require careful consideration of the total cost of the change and of the likely evolution of the different input costs.

As with the deployment of technical levers, effective demand management is by necessity a collaborative process. Best-in-class companies often find it useful to run workshops involving technical and manufacturing staff from all affected business units, together with colleagues from purchasing and representatives from suppliers. In these workshops, cost-saving ideas are identified and evaluated, and then the most promising ideas are taken forward to be tested and rolled out across the organization.

Tackling the tail

Analyses like those described above are a powerful way to deliver cost savings for the most important products in a company's purchasing portfolio. But the depth of knowledge and complexity of analysis required makes a similar approach unfeasible for the thousands of items that make up the tail of a company's spending (shown in the bottom left quadrant in Exhibit 2). That does not mean chemical companies can't achieve significant savings across these categories: what they need to do is find an approach that balances management costs with savings opportunities.

For one, companies can buy products from the same suppliers they use for critical, high-volume materials, aiming to achieve more favorable prices through the bundling. They can conduct a request-for-quotation exercise or ask for a discount from existing suppliers.

Alternatively, they can aim to eliminate the requirement for the material altogether by substituting something else for it or stopping its manufacture, for instance, when the end product is a niche offering with little commercial value.

Another valuable approach involves the use of third-party distributors. By bundling multiple categories with a few carefully selected distributors, companies can secure volume agreements across categories and reduce the number of small suppliers they need to manage in-house. The distributors themselves, meanwhile, can often obtain favorable terms with manufacturers thanks to the higher volumes they purchase for multiple companies. Distributors may also be able to identify more cost-effective sources for tail-spending categories, for example, by researching and qualifying new suppliers in low-cost regions.

Distributors must still be managed with care, however, to ensure they do not add excessive charges for services such as repackaging bulk materials in smaller containers. Once again, chemical companies can use clean-sheet techniques or analysis of different suppliers to identify “should” costs for such services and compare these with terms offered by their distributor partners.

Companies that have taken a systematic approach to tackling their tail spending typically find they can achieve overall savings of 10 to 15 percent through a combination of bundling higher volumes with suppliers and negotiating improved terms with those companies. Such savings can often be captured quickly, with the entire analysis, segmentation, and renegotiation process taking as little as three to six months.

Managing purchasing performance

To underpin all the purchasing levers described in this article, chemical companies need a strong management approach, with clear and regular tracking of the savings achieved. Tracking savings is vital for chief purchasing officers because it lets them see how different parts of the purchasing organization are performing. But it is also important for the wider

organization because it demonstrates the impact of advanced purchasing approaches and helps best practices to gain wider adoption.

Measuring and tracking performance is not always straightforward, however, particularly for categories where the purchase price is index driven or dependent on underlying oil or energy costs. To avoid purchasing teams being rewarded—or punished—for changes outside their control, leading companies track savings by measuring the discount obtained against the appropriate index. They then record year-on-year increases in that discount as savings achieved through improved purchasing performance.



For many chemical companies, purchasing excellence demands a significant change in technical capabilities, processes, and mind-set. That doesn't happen overnight. The best companies look at purchasing transformations as a journey, in which each step builds on the foundations of their current strengths and provides a platform for further improvements. With commitment, top-management support, and a strong plan in place, we've seen chemical companies complete that journey in two to three years. In doing so, they have been able to achieve overall spending reductions of 6 to 10 percent while simultaneously improving supply security and reducing their exposure to volatile commodity prices. ■

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