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A new formula for global chemicals supply

How multinational companies can transform their supply chains in light of disruption

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EXECUTIVE SUMMARY

The chemicals sector is changing rapidly. For the past 20 years, multinational corporations have been consolidating their supply chains to the point that some products can be sourced from only one or two countries. Lower costs, the ability to produce larger volumes, and stricter environmental regulations in developed countries all contributed to this shift.

Currently, for example, China's output accounts for about 39 percent of the global chemicals sector,[1] and the sector in China is expected to expand at a compound annual growth rate (CAGR) of around 5 percent until 2025, involving total sales of US$4.85 trillion. This growth compares with around 2.7 percent CAGR in the U.S., 1.3 percent in Germany, and less than 1 percent in Japan over the same period.

Business leaders well know the risks of overreliance on a single, or limited, market for raw materials and intermediates. This situation is leading some multinational companies to rethink and diversify their supply chains, which represents a new set of challenges. Companies in the chemicals industry must build wider and more robust supply networks, looking beyond any one country to do so. Because many governments are becoming more environmentally conscious, companies must focus on removing most highly polluting substances and processes from their product mix. Nonetheless, there are ways in which they can expand their market share and profitability.

To compile this report, Strategy&, PwC's strategy consulting business, interviewed top executives at five leading global chemicals companies — three based in Germany and one each in China and the U.S. — that had deep experience in global trade. Using insights from these interviews and observations of the industry, we propose measures that global companies can take to manage the changes in chemicals supply.

For the short term, these measures include securing supply, using alternative formulas, and resorting to a financial buffer. For the medium term and long term, companies have a limited window of time in which to create a favorable competitive position. The recommended measures include establishing a resilient supply chain, reviewing product portfolio and business segments, and staying vigilant.

1 "Inflation adjusted global chemical industry sales," IHS Markit, Jan. 17, 2019.

Inside the shift toward environmental and safety practices

Higher environmental standards around the world are increasing pressure on the production of some chemical inputs. This has led to:

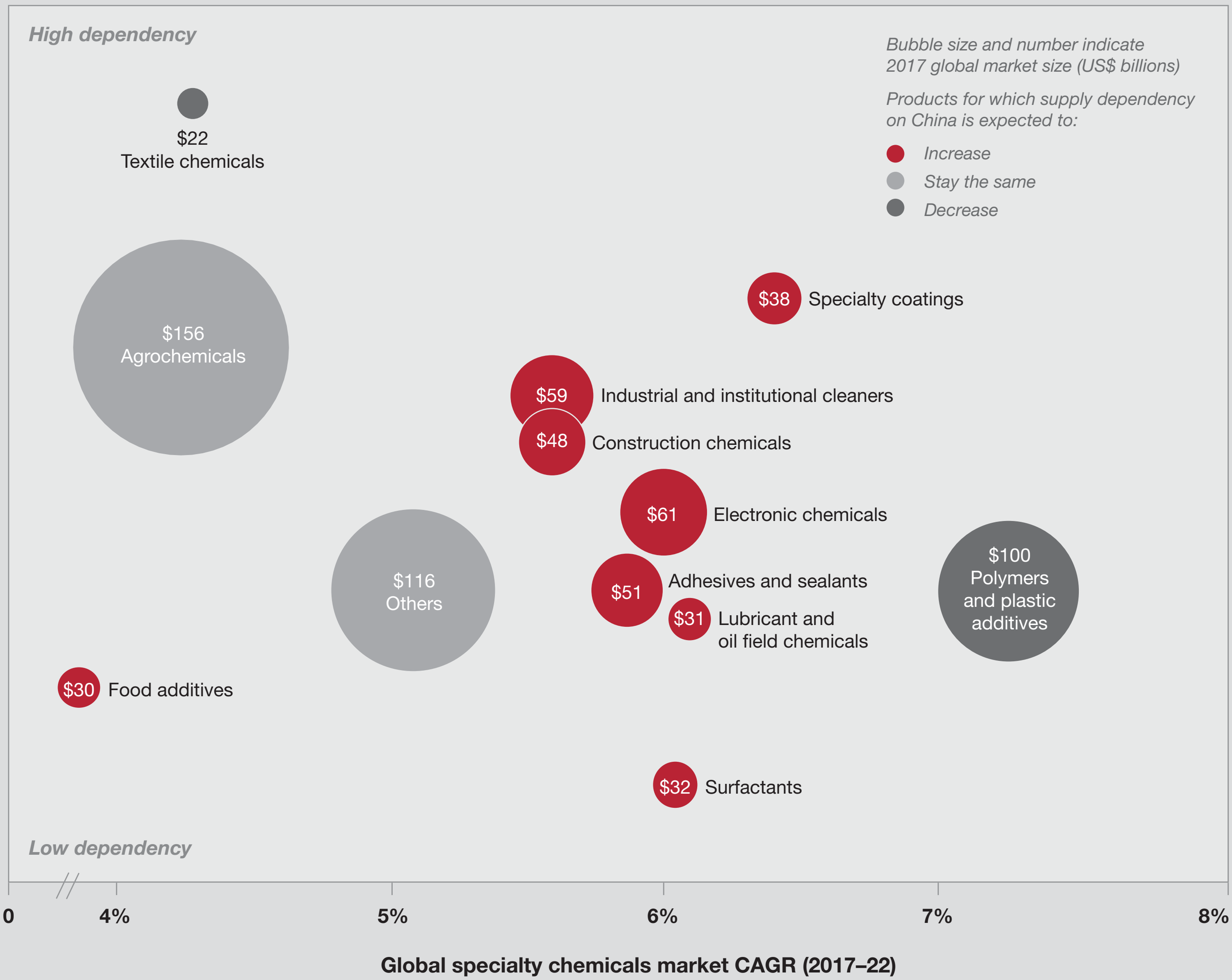
- A severe shortage of critical raw materials for specialty chemicals and agrochemicals, including metribuzin, a major ingredient in herbicides; glycine, a base material for glyphosate, another herbicide; and dichloroanthraquinone, which is used to make dyes
- Multinational chemicals companies being unable to source supplies and declaring *force majeure* on unfulfilled orders
- Multinational companies looking at alternative sourcing locations, including India, the Middle East, and high-cost countries
- Consolidation, as small chemicals plants have been taken over by larger rivals (indeed, we expect significant consolidation in the next 10 years)
- Price increases of as much as 500 percent for certain specialty chemicals used in everyday products such as printer's ink, pesticides, and food and drink packaging.

One executive at a global specialty chemicals company put it this way: "There has been a heavy impact because several of our products are single-sourced. The suppliers that are able to deliver have increased their prices continuously, leading to a 200 percent rise over the past 12 months."

Exhibit 1 (next page) shows the dependency of various specialty chemicals categories on supplies from just one country — in this case, China. It also shows how this supply dependency is expected to change over time.

EXHIBIT 1

Global dependence on Chinese supply



Source: Technavio, "Global Specialty Chemicals Market, 2018–2022" (published 2017), PwC's Strategy& analytics

Managing the value chain now

What actions can leaders of multinational companies take over the next few months? Several measures can help ensure adequate supply in the short run, and others can pave the way for a more coherent long-term strategy. Three short-term measures are worth considering for immediate action.

1. Securing supply. To honor existing contracts, companies should seek out new suppliers that already work to the standard they require. Some German chemicals companies have been able to source the products they need in Europe, although the volumes supplied are limited by the European Union's REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) regulation. This statute sets limits on the production of all chemicals while requiring producers to submit detailed plans and production recipes to the regulator. Other raw materials can be sourced from India, but the quality is variable, which means companies must adapt their production processes to accommodate the difference.

Buying finished products through contract manufacturing is another possibility. However, if the purity of the finished product does not meet the required standards, purification will be the responsibility of the company, which will incur cost.

If a company can secure an alternative source, a further option would be to increase inventory levels of those raw materials or intermediate materials, to provide a buffer against future supply risks. To be sure, holding higher amounts of inventory ties up working capital, but it may be a cost worth bearing.

2. Using alternative formulas. Many chemicals suppliers will probably abandon the most toxic raw materials, intermediate materials, and the dangerous production processes they are using.

Thus, companies should consider changing the recipes of products and manufacturing processes, especially those of products where no alternative supplier exists. A number of the executives we surveyed are looking into alternative but more expensive synthesis routes — that is, ways to combine chemicals — as a work-around to production shutdowns.

Using these tactics might affect profitability because of the higher cost of alternative raw materials and the higher operating cost of safer and more sustainable synthesis steps. Waste treatment costs will also increase, on top of the one-time cost of upgrading production assets. Again, these costs may be worth bearing.

New production processes are not necessarily time-consuming to set up, so they could be part of a short-term solution. However, adjusting processes to achieve the right standards can take time and, in the case of agricultural chemicals, reformulated products and new suppliers must be registered.

3. Resorting to a financial buffer. If a company cannot find another source in the short term for the raw and intermediate materials that it has been buying, it is likely to face product shortages or have to declare *force majeure* on existing contracts. In such cases, the company would need to build a financial buffer to make up for loss of revenue or to mitigate potential penalties until production restarts or new suppliers are added.

Also, companies should consider how to treat employees if production of certain products stops. Like many of the executives interviewed, leaders of other companies may be reluctant to lay off trained staff. Some executives are considering alternative measures, such as deploying people to other production sites where demand is increasing or instituting shorter working hours.

Future alternative production locations

In our interviews — three based in Germany, one each in China and the U.S. — four regions emerged as alternative sources for specialty chemical raw and intermediate materials: India in the nearer term, and the Middle East, Africa, and South America in the medium term (see Exhibit 2). Some U.S. and European producers are also seeking to manufacture certain substances in their home regions.

In India, Saudi Aramco announced in 2018 that it planned to develop a $44 billion refinery and petrochemicals complex, with a consortium of Indian companies, in the Indian state of Maharashtra.[2]

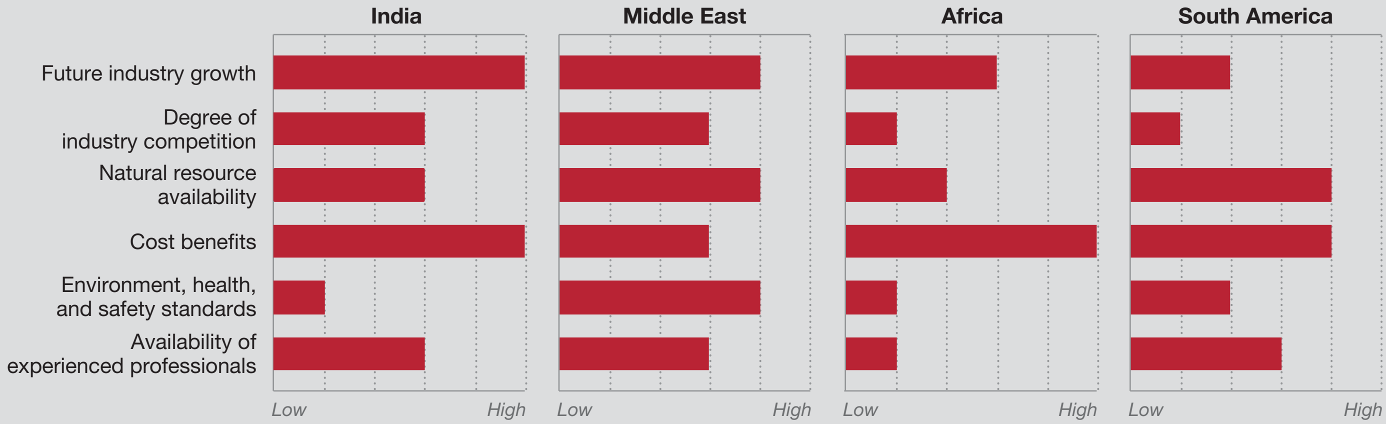
It is important to stress that such changes are not a quick fix. Extending a company's supply network and getting new suppliers to work at the required standards takes at least a year in most cases. Building facilities will take even longer, particularly in parts of Africa that lack the necessary infrastructure. It is still vital that companies examine their supply network holistically, taking into account the need for regional or global supply, the time and cost of delivery, and the quality requirements for different products and geographies, as well as political risk.

We do not believe any of these countries offer a true alternative for the long term if companies use them only as a stopgap to evade environmental controls. As more countries raise their environmental and safety standards, some products will become too toxic or dangerous to be produced anywhere.

EXHIBIT 2

Potential alternative sources of specialty chemicals

Degree of attractiveness to multinational companies



Source: "Inflation adjusted global chemical industry sales," IHS Markit, Jan. 17, 2019; PwC's Strategy& research

2 Anjli Raval and Simon Mundy, "Saudi Aramco in Talks to Buy Reliance Industries Stake," *Financial Times*, Apr. 17, 2019.

Competing in the future

China's remarkable growth in chemicals means the country will remain a vital market for the multinational chemicals industry. At the same time, Chinese companies are moving rapidly toward high-quality and more complex products. Other chemicals companies have a small window of opportunity to respond to this change, to reposition themselves, and to establish a competitive position for the medium and long term.

In general, in every territory where a chemicals company does business, this will mean playing to strengths. These strengths probably include high environmental and safety standards, strong financials, a powerful brand name, and a focus on innovation. Companies can use these assets to build a sustainable, long-term global business model that is well placed to take advantage of future growth. Three more specific recommendations can help toward this goal.

1. **Establishing a resilient supply chain.** A range of options can ensure access to sufficient alternatives in the future. These include securing supply through restructuring; setting up joint ventures with, or acquiring, key suppliers; building production sites for critical materials, or looking for alternative supply locations around the world. We examine some of these and other options in exhibit 2 (page 6).

- **Restructuring.** For companies with factories that meet new environmental standards, the current situation offers an opportunity to grow market share, reduce the number of competitors, become more profitable, and reduce supply chain risk.

  If this is difficult, restructuring may be feasible. This approach could take the form of mergers and acquisitions, or joint ventures. For example, Evonik — a global specialty chemicals company based in Essen, Germany — formed a joint venture in 2018 with Wynca, a Chinese producer of silica used in sealants and adhesives.

  International companies seeking to acquire local producers to reduce their supply chain risk are typically looking at midsized companies that are already part of their supply chain. Some small sites with low environmental and safety standards would require a high level of investment to reach the required level, making them less attractive as acquisition targets.

- **Strategic partnerships.** Multinational chemicals companies should leverage their strong brand names and already high environmental standards to build their own production facilities, or form partnerships with local players. Germany's BASF, for example, confirmed in 2019 that it would open a $10 billion petrochemicals facility in Zhanjiang in China's Guangdong province.[3]

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3 Chen Aizhu,"Germany's BASF chooses southern Chinese port as site for $10 bln petchem complex," *Reuters*, Jan. 9, 2019.

2. **Reviewing product portfolio and business segments.** Multinational companies can optimize the resilience of their supply chain only to a certain degree, because risk mitigation will, on the whole, increase costs and dilute margins. A strong, sustainable supply chain would be too expensive to be realistic for low-margin segments with low growth rates.

   In the long term, more countries will crack down on pollution, so companies will have little choice but to find less toxic alternatives or pay for the necessary level of waste treatment. Companies should therefore evaluate their product portfolio on the basis of profitability, growth rate, supply dependency and risks, and the cost of alternatives. If a segment is not attractive, it should be cut.

   Few companies are currently thinking in terms of such radical changes to their existing product portfolio, but there are some notable examples: Swiss chemicals maker Clariant is planning to divest its pigments business,[4] and Lanxess, a Germany-based specialty chemicals company, announced in August 2019 that it was selling its chrome chemicals business to Brother Enterprises as part of streamlining its operations.

3. **Staying vigilant.** Multinational chemicals companies must continually monitor market changes at a global level, for example, sustainability trends, quality requirement changes, and consolidation among their peers. They must also continually assess the impact of these changes on the company's overall operations, including its product portfolio and supply chains, and be ready to adjust their strategy accordingly.

   As environmental and safety standards tighten worldwide, compliance has become a vital part of risk management. Two chemicals companies — BASF and Dow — are introducing environmental targets for their own operations and for their supply chains.

   In its 2019 management report, BASF outlined the nonfinancial targets that it has placed alongside financial targets in its business strategy. It aims to grow production volumes without increasing its carbon emissions in order to mitigate climate risk. It also aims, by 2025, to be carrying out sustainability evaluations on suppliers that account for 90 percent of purchases. BASF will also work with its suppliers to improve the sustainability of the suppliers' operations.

   Similarly, in its recent announcement of sustainability goals for 2025, Dow stated that its long-term goal was to ensure that "every material we bring to market is sustainable for our people and our planet."[5] The company aims to replace 10 materials with sustainable alternatives by 2025.

4 Arno Schuetze and John Miller, "Clariant begins 2020 sales plan with search for pigments buyer," *Reuters,* Jan. 10, 2019.

5 "Dow 2025 Sustainability Goals: Maximizing Economic, Environmental and Societal Value," Dow, 2019.

Act now

The risks in today's supply chains are undeniable. However, the changing landscape also offers opportunities for multinational companies buying from and manufacturing in China.

Multinational chemicals companies must first establish a short-term plan to secure supply or find alternatives. In the longer term, multinational companies should take back control of critical competencies by staying vigilant when it comes to changes in the business environment. They must also adjust their product portfolios to ensure long-term competitiveness — even if that requires making painful changes in the coming years.

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