



What is the right
formula for agility
and resiliency?

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Confronting a complex landscape

Chemicals companies provide the building blocks of the products we use every day. And amid the COVID-19 pandemic and the resulting economic fallout, with the demand for certain goods surging and others collapsing, meeting the needs of end consumers has never been more critical – or daunting.

While the pandemic has intensified the shockwaves of disruption, the landscape has also been roiled by volatile oil prices, tighter border restrictions and other geopolitical concerns that will likely persist long after COVID-19 treatments are developed. This environment challenges the assumptions behind how chemicals companies have chosen to structure their operations and supply chains, and even how they build their plants. Before, many companies were focused on driving cost efficiency at the expense of flexibility – a mindset that, today, may be counterproductive amid so much uncertainty.

Yet there are no easy solutions for chemical leaders currently. The impact of the pandemic across the sector varies widely, and can be positive, because of the end markets that each company serves. Demand for some end products, such as automobile parts, has dropped off dramatically, although it has surged in consumer goods and textiles. You can see the dynamics at play in polypropylene:

it's used to make plastic components in vehicles, an area of business that has dried up, but it's also vital for creating much-needed N95 masks.

Geography also plays an important role, as virus hot spots flare up and level off at different times worldwide. Asia-Pacific has more mature pandemic protocols and more stable operations currently, but the product demand there may be lacking. In Europe, closed borders and bottlenecked ports created such steep hurdles for shipping that some production has moved to the US. Meanwhile, oil prices add yet another layer of volatility, redrawing the map for what can be produced cost-effectively in which region – for instance, producers in the US relied on a price advantage from natural gas that has since evaporated.

Amid this churn of variables, chemical companies should strive to further develop their capabilities – across the overall structure of the company, the customer base, the geographic footprint,

and the supply and manufacturing network. They face questions such as:

- ▶ How can you not only adjust to these dynamics but plot a post-pandemic future?
- ▶ Who will remain in business in the market, and what will demand look like?
- ▶ What should your product mix look like?
- ▶ How do you balance the need for minimizing costs in your supply chain with the need for agility and flexibility?

The answers lie in your ability to explore different contingencies, plan for them and build in optionality where possible. Complexity exists across all end markets, geographies and business units, so leaders need to answer some difficult questions as they look to the future, without relying heavily on one road map.

Bigger changes can provide greater agility

Plant operations show the constraints the chemical companies face in trying to pivot amid uncertainty. Production changeovers are less flexible, with higher losses on each turnaround. Production cycles are longer, so companies need to maintain more raw materials and inventory. Stricter industry regulations are placed on some materials, and equipment must be certified. Taking one recipe or product line and trying to shift it into another plant can be daunting.

Even so, some companies may find it useful to rethink some commonly held assumptions about what they can do, particularly amid so much uncertainty. If your leadership says, "Let's get into the hygienics business," or sees an opportunity to launch a new business, to what extent can you repurpose assets?

In response to a shortage of hand sanitizer, one large producer of isopropyl alcohol and ethanol created four new manufacturing units – in under 10 days. Each site, set up in existing facilities, now produces 1 million units per month. Later, the company opened two new plants under the name of a new business, with a wider range of branded hygiene products, and it's exploring acquisitions to bolster its position as well, understanding that its commodity-focused operations will need different skill sets.

Today, many single-product plants are still being built, immediately boxing companies into narrowly defined use cases. Multipurpose and modular multi-batch facilities and plants cost more to build, and utilization is typically also not that high because of changeovers, but they provide greater flexibility, without being as dependent on demand in one market or group of end customers. Other industries, such as food and consumer products, are far ahead of the chemical sector in this regard.

Multipurpose and modular multi-batch plants also offer greater advantages and scale when factoring in recycling and reuse due to their semi-continuous material flow concept. Sustainability is poised to continue growing in importance. Earlier in the pandemic, lockdowns created steep economic losses but significant benefits to the environment due to reduced emissions and pollution. While single-use plastics are also in vogue right now, consumer attitudes are heading more into a green direction: the EY Future Consumer Index in May 2020 found that 26% agreed with the following statement: "I will pay more attention to the social impact of what I purchase and consume."

One worthwhile exercise that can potentially make your business both greener and stronger is to investigate more regional, modular



supply chains. When your goods spend less time in transit, there's less of an impact on the environment, and fewer opportunities for disruption. Rethinking your supply chain is a necessary course of action if you're also investigating how to bring new products to market and create flexibility in how you respond to demand. Having backup plans – in suppliers, logistics and operations – to move very quickly to regional, where it makes sense, can be important to prepare for future disruptions, particularly as geopolitical disputes become more frequent and globalism faces challenges.

Amid reports of crucial medical equipment stuck without getting cleared for export, the

COVID-19 pandemic has some governments asking about how to reduce reliance on foreign sources of critical goods, such as medicines made with raw ingredients from across the world. Tension between countries and accusations of predatory behavior could spur tighter regional alliances and regulations, mandating at least some percentage of local production for critical goods. Scenario planning can help you understand these possible hurdles to how your company structures itself globally. And to diversify risk, lower-cost regions such as South Asia, Central and South America, and Eastern Europe may start to get more traction as operational locations.

Scenario planning and the impact on supply chains

Greater sustained focus on supply chain resilience is crucial, because amid the pandemic, gaps in planning maturity have suddenly deepened into wide chasms, leading to standstills. In fact, by late February, 94% of Fortune 1000 companies reported supply chain disruptions.

Leading companies have mature capabilities involving:

- ▶ A single consolidated view of supply chain capacity, availability, product flows and working capital
- ▶ A central function that matches demand and supply, monitors orders, and coordinates issue resolution
- ▶ Agile sales and operations planning, that's not just a monthly meeting, as well as dynamic demand and inventory optimization beyond planning
- ▶ Up-to-date contingency plans and scenario simulation capabilities

Over the past years, chemical players in the industry have been working to build out this level of agility. And while many have made strides, they may still be lagging in certain areas, or some individual business units may need more help than others. Your resilience strategy should be based on defined, common goals and driven by outcomes in the short term. Begin with shifting to weekly integrated business planning instead of monthly, with daily demand sensing and refreshes. These exercises are useful in many situations, including how you re-engineer yourself moving forward.

Ensure that your supply chain risk assessments are truly end-to-end

In the COVID-19 environment, your company is likely performing these assessments regularly, to the point where they have become familiar. To refine and enhance your approach to move on to true resilience, determine whether you can widen your lens to bring in more variables for a greater understanding.

A powerful calculated risk index relies on end-to-end assessments, stretching from the customer (or the customer of the customer) to the supplier, and aligned to your organization's risk aptitude and attitudes. This approach should not overlook functional and process areas beyond the supply chain itself and other players within the supply chain ecosystem, including contractors, distributors and logistics service providers.

Your assessment models also shouldn't be overly deterministic, meaning that they produce outputs that are rigidly correlated to a handful of factors, without respecting the fluid environments of today and the dynamic ways in which you can respond to them. For instance, if your model didn't account for

a pandemic, then how useful is your model? Through a stochastic model, you build thousands of potential outcomes – accounting for variables with a range of tariff policies, GDP possibilities, COVID-19 treatment schedules and more – and not just a number. This isn't optimization: it's rigorous and continuous refinement to keep you a step or two ahead of the competition.

And "risk" should not be narrowly defined to mean purely the downside risks, like the possibility that certain ports will become bottlenecks when production is ramped up. For instance, it could make more sense to be vertically integrated within a region, without lags of transit, even if it means that cost will be higher without the same efficiencies of scale. Here, the risk stems from inaction, not necessarily an outside event.

Define scenarios and identify gaps

Scenario planning can involve crisis situations, in which severe shipping bottlenecks or plant shutdowns are experienced. In this environment, geography is a crucial factor to plan against, as the pandemic and its ripple effects impact each country and even city differently, and therefore various end markets differently as well.

It's also valuable to think more broadly, through a similar lens, to find every pocket of demand. Today, some chemicals companies are repurposing their assets and supply chain to produce higher inputs for medical supplies and cleaning and disinfectants, such as isopropyl alcohol, biocide chemistries, polypropylene, polyurethane and medical-grade polycarbonate resins. What are the implications if you temporarily shift toward COVID-19-related products? Or if you change your product mix, or size of your batches, because of shifting demand? What are the impacts of public policy – for instance, consumer incentives to buy electric vehicles, which China is pushing but the US isn't?

Evaluate the impact of current-state gaps, factoring in your risk assessment findings. How will those scenarios affect

your inventory, capacity constraints, workforce allocations, warehousing, growing backlogs and cash flow, among other items, that ultimately impact supply-side and demand-side analytics? Test and evaluate against these potential scenarios by activating existing policies and protocols to identify disparities and disconnections within your current supply chain model.

Sharpen your response

Define potential triggers that will help to revise plans into action, either in preventing a looming crisis or enabling an agile response to new opportunities – considering people, process and technology factors. Execute further simulations to validate effectiveness against established criteria defining what success looks like. Responses can range from the preventive to the reactive. The proper choice of response and investment therefore depends on determining the likelihood of the scenario and the impact so the business knows the risks that it is prepared to take.

For one chemical distributor, that intervention response sprang into action during the COVID-19 outbreak, in which the company's operations team quickly moved to maintain security of supply from their global sourcing partners. While its assessment showed that most of its supply was from regions that the World Health Organization did not consider to be high risk, the team shifted its sales and operations planning process from a monthly to a weekly cycle, with daily analysis. This ensured that the company had the right inventory and could minimize the whiplash effect with its supplier partners. It also instituted measures to maintain reliability, including contingency shipping routes and modes, securing additional logistics capacity, and moving chemicals and ingredients in its network.

Build out technology capabilities

Explore how to combine technologies like artificial intelligence and machine learning with digital process mining, in order to tease out patterns of inefficiencies in event logs and rectify

them quickly. Machine learning can also be used to identify demand patterns for planning. To increase the visibility and monitoring of your global supply chain, use real-time satellite monitoring/analytics. You can also create a digital twin of the supply chain to analyze the impact of future events and react in real time to potential facility shutdowns, port strikes and other issues requiring large-scale crisis management.

Get closer to your customers – and team

Perhaps a year ago, orders from your customers may have been predictable from month to month. Yet now, and in the new normal, not much is predictable. Rather than waiting for your largest customers to give you a physical order, tie in with them into their own integrated business planning processes for synchronization. Shared forecasts lead to greater understanding about demand, months ahead of time. Supplier reliability also provides a huge perk in terms of customer service.

And lastly, bring your resources more closely together within your own business. Now more than ever, boxing in your talent within one spot in your org chart and hierarchy is a deep mistake – moving ahead in this challenging time requires collaboration and contribution from everyone.

The COVID-19 pandemic has been a uniquely disruptive event. Some chemical players are faring well and others are not, but most must confront the fallout from scrambled markets, logistical headaches and changing cost dynamics. And even if new treatments are developed tomorrow, the need for flexibility, resiliency and agility remain in the face of ever-present disruptions. Prepare now for how you'll swerve on the road ahead.

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