Six Keys to Building Resilience, Agility and Recovery for the Chemical Industry

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Executive Summary

In the current extreme VUCA (volatile, uncertain, complex and ambiguous) environment, chemical producers are learning the importance of operating with insight and agility. At the same time, companies are being tested for the depth of their resilience, and learning how to navigate huge shifts in demand, supply, workforce and economics, and emerge from this crisis in a stronger position.

For many organizations, these shocks have stretched beyond planning boundaries, often resulting in them asking what more can be done to prepare. If rebound and relapse happen as predicted, how do organizations manage the extreme volatility that may continue into next year?

Certainly, the chemical industry has been heavily impacted by COVID-19, as many chemical application markets — especially automotive, construction and appliances — have seen a major drop in demand. Additionally, supply chains have been disrupted, and the precipitous drop in oil prices has shifted feedstock prices and regional competitiveness. Plant workforces, meanwhile, have heightened concerns about their health and safety, all while learning to work with a minimal number of employees on the plant floor at any one time.

> "Unsurprisingly, the organizations that were furthest down the digital transformation journey before COVID-19 struck are tending to adapt better than their peers."
>
> ***Andy Baldwin***
> *Global Managing Partner, Client Service, EY*
> *"How to plan your company's future during the pandemic"*
> *World Economic Forum*
> *April 25, 2020*

Even as most markets have stalled, chemical companies around the world have shifted some production to address heightened needs for Personal Protective Equipment (PPEs) and medical products to meet a meteoric rise in demand in light of the pandemic. In fact, both the chemical and plastics industries have been designated as "essential" during the crisis.

Key applications where chemicals and polymer are essential include:

- **Intermediate chemicals for hygiene and medical applications:** especially alcohols for hand sanitizer; chlorine and hydrogen peroxide for disinfectants and surfactants for cleaning agents
- **Plastics for medical applications:** especially polypropylene for medical gowns and face masks; polyvinyl chloride for IV bags and tubing; and polyethylene for packaging to protect food

The effectiveness of chemical producers to keep up with the huge shifts in demand, global supply chain variability, and new workforce needs while ensuring plants reliably perform to safety standards is often tied to their ability to take advantage of capabilities enabled by digitalization.

Challenged with rapidly shifting most of their workforces to remote and work-from-home environments, chemical businesses are re-examining their digital capabilities, and increasing their focus on digitalization as an essential long-term strategy.

Faced with Navigating Business Challenges and Volatility at Every Turn

Chemical companies are experiencing unexpected economic scenarios, adapting operations to rapidly changing demand, and adjusting workplace structures to ensure the safety and health of their workers. Those businesses who are agile as well as resilient, will be best prepared for recovery when it comes.

Economic

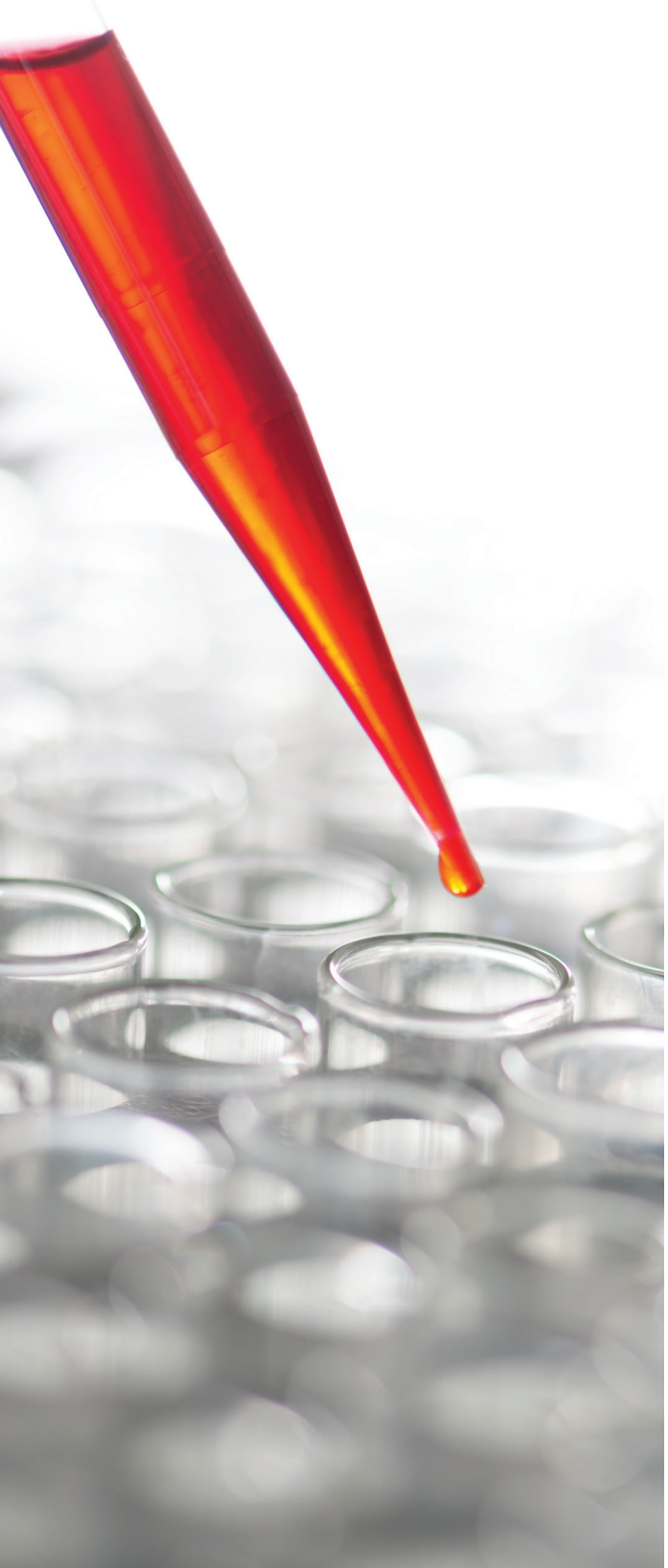
- Current conditions are forcing chemical companies to cut costs and make tough decisions about capital expenditure (CAPEX) reductions. Businesses are concerned about making the best choices for cost, production and risk.
- Global chemicals demand will gradually resume as economies and consumer markets, like automotive and construction, gradually begin to reopen, but there will be fits and starts.
- The chemical industry relies on smooth global supply chains. Supply variability does not work within this framework so the supply chain will be "lumpy" for a while.

Production

- Responding to drastic supply and demand fluctuations requires fast and accurate data. Insights from digital data platforms help operators to make informed decisions to execute transitions quickly without sacrificing safety or quality.
- Chemical companies will need to become more agile and cost-effective to respond to supply and inventory disruptions across their value chains.
- For some bulk chemicals, irregular feedstock availability due to local refinery outages or port delivery delays are cascading back to operational disruptions.

Remote Workforce Support

- As chemical companies shift to the new norm, they are looking to leverage resources and employees in new ways to manage economic and production uncertainty.
- Businesses need solutions that support their employees with collaboration and remote access for business continuity as they shift to reduced and offsite workers to address travel, safety and expense reduction business requirements.
- The current circumstances are driving an accelerated virtual and digital learning strategy. A structured online training / certification program can provide any employees feeling isolated or anxious from working remotely with a sense of accomplishment at precisely the time when they might need this.
- Safety and health are a concern and will become an even greater consideration in the coming weeks as we move to re-opening plants and restarting; operators are scared about what will happen as demand shift normalizes and more workers return to the plant.



Why It's Important to Have a Digitalization Strategy (Especially Now)

For the chemical industry, the current conditions are a unique opportunity to optimize business processes and get closer to customers. Digital technologies provide insight on operations and capabilities of production systems, enabling greater visibility on status and integration, as well as deep exploration of alternatives to aid decision-making.

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Six Keys to Using Digital Now to Optimize Business Across the Asset Lifecycle

There are short-term initiatives chemical companies can implement — and are already implementing — to navigate today's volatility and uncertainty, as well as prepare for future economic recovery.

1

Adapt process to meet variable market needs

Using digital twin technology, you can create twins of existing assets to define new production boundaries and potential alternate sites — while integrating safety limits and cost concerns. Digital twins can also be used to bring plants online faster and train operators for unexpected operating upsets.

2

Optimize production with APC technology

Today's advanced process control stabilizes operations within a new target range as demand varies, integrating capabilities of assets to find optimal operating conditions. For many units, this optimization can be done dynamically to ensure operational efficiency, even at low rates.

> ***EXAMPLE:*** Wacker refers to advanced process control as "the cornerstone of digitalization." The company views APC as the foundation to maintain margins, including minimizing energy use, and a critical tool to manage operational interruptions.

3

Improve product quality with insights from existing data

Multivariate analysis identifies causes of process variability and targets the optimum conditions to improve product quality, yield and throughput. This analysis can be particularly valuable when market volatility shifts operations to new and unexpected regimes, helping to define the "new optimum" conditions.

4

Develop agile production planning

Leverage new tools to increase supply chain alignment and collaboration between teams in remote locations, even as market expectations rapidly change. Enable quick reviews of alternate operating and supply scenarios to help staff make more informed decisions about operations and alternative economic options for better business outcomes. Also, enhanced collaboration tools help to boost individual and team productivity across supply chains and operations.

EXAMPLE: A global chemical customer is running many scenarios every day to build a portfolio of supply chain "game plans" to best respond to existing and future supply/demand conditions, constraints and implications. The company appreciates that as changes happen in different countries where they operate, the flexibility in AspenTech's solutions can help ensure business continuity.

5

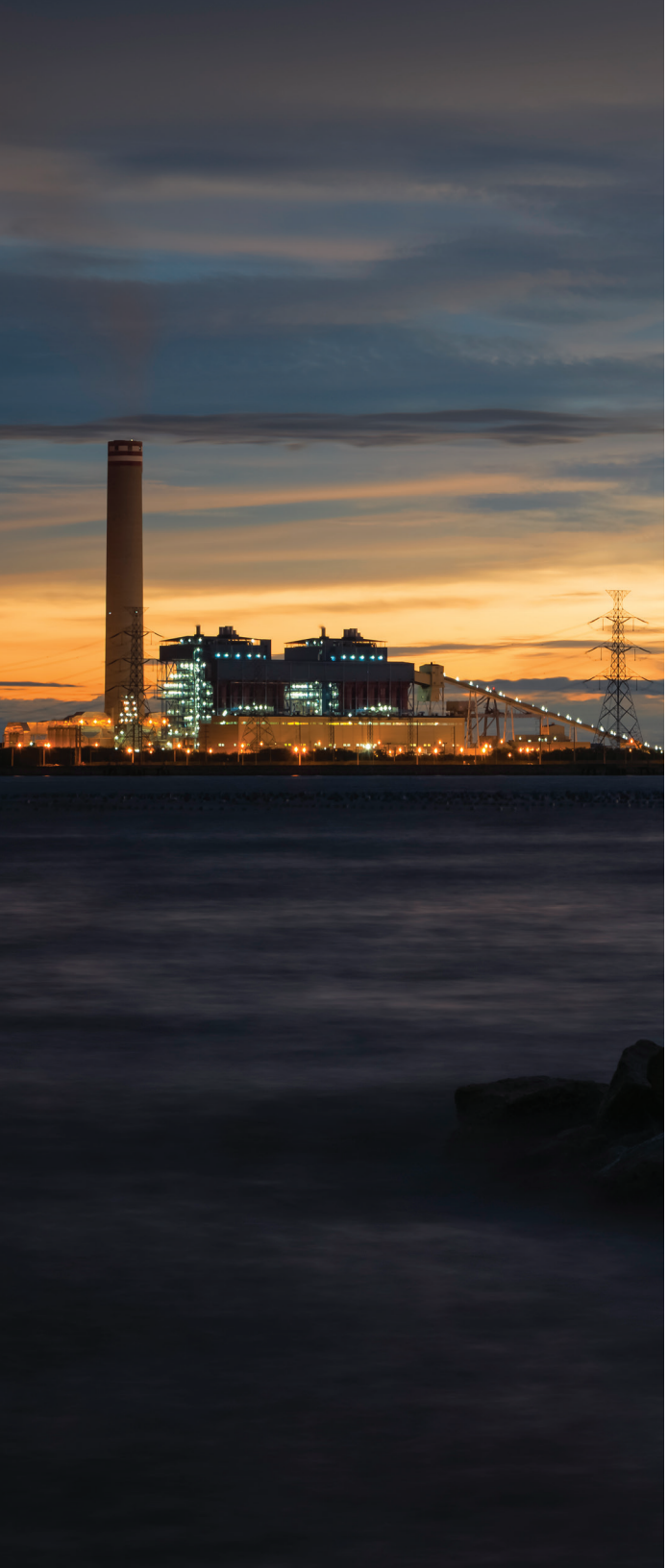
Maintain plant equipment reliability

Reliability concerns increase as maintenance activities are delayed and non-routine operations create equipment stresses. AI-enabled prescriptive maintenance uses operational and equipment data to provide critical insights on potential breakdowns and guidance to operators to reduce equipment stress and maximize uptime.

6

Increase visibility of operations across the enterprise

During uncertain times, it's important to have insight into activities across units, sites and regions. Integrated analysis tools can help to identify and diagnose issues while handling large numbers of remote users at fast speeds over VPN. These tools can also help engage operators to identify and troubleshoot process issues and build custom dashboards which keep management up-to-speed and focused on critical issues.



The Path to Recovery

Several chemical companies have effectively taken advantage of existing digital investments during these challenging times, and many others are expanding their digital efforts to maintain safety, operations and productivity. Agility will clearly be an important capability for businesses moving forward, as markets recover unevenly and the path to return to pre-COVID work environments remains uncertain.

Digital twins are especially valuable in this volatile environment, whether for asset flexibility or supply chain options, to assess multiple scenarios to make more informed decisions. Additionally, their value as training tools for operators cannot be underestimated, especially as plants may experience more slowdowns, shutdowns and start-ups over the next several months.

As companies address immediate challenges, the focus on the long-term needs of the industry has not been forgotten. Sustainability targets remain in view — and the supporting digital strategies will be a part of recovery efforts, helping to improve environmental impact, safety. reliability and future innovation.

Helping Businesses During This Transition

The chemical industry is facing unprecedented challenges from an economic, production and workforce perspective. At AspenTech, we help chemical producers by optimizing their assets to run safer, greener, longer, faster — and with more sustainability and resilience to better handle ever-changing demands.

AspenTech customer and training websites, as well as customer support systems, are available 24/7 to rapidly respond to companies and their teams who are operating remotely or from home. Our customers have confirmed the value of these services as thousands have taken advantage of greater access to training courses and certifications, clearly building future capabilities to expand their digitalization efforts. We can help your business move successfully through the current market state and prepare for recovery.

Learn more at: www.aspentech.com/en/solutions/covid-19-response

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Aspen Technology (AspenTech) is a leading software supplier for optimizing asset performance. Our products thrive in complex, industrial environments where it is critical to optimize the asset design, operation and maintenance lifecycle. AspenTech uniquely combines decades of process modeling expertise with machine learning. Our purpose-built software platform automates knowledge work and builds sustainable competitive advantage by delivering high returns over the entire asset lifecycle. As a result, companies in capital-intensive industries can maximize uptime and push the limits of performance, running their assets safer, greener, longer and faster.

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