Chemical sector growth, AI adoption and regulatory challenges foreseen

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After a market softening due to short-term challenges, the chemical industry appears braced for growth, according to a 2024 survey of subscribers to the American Chemistry Council's SmartBrief newsletter. It was conducted in partnership with SAP, which provides software solutions for most of the nation's leading chemical manufacturers and processors.

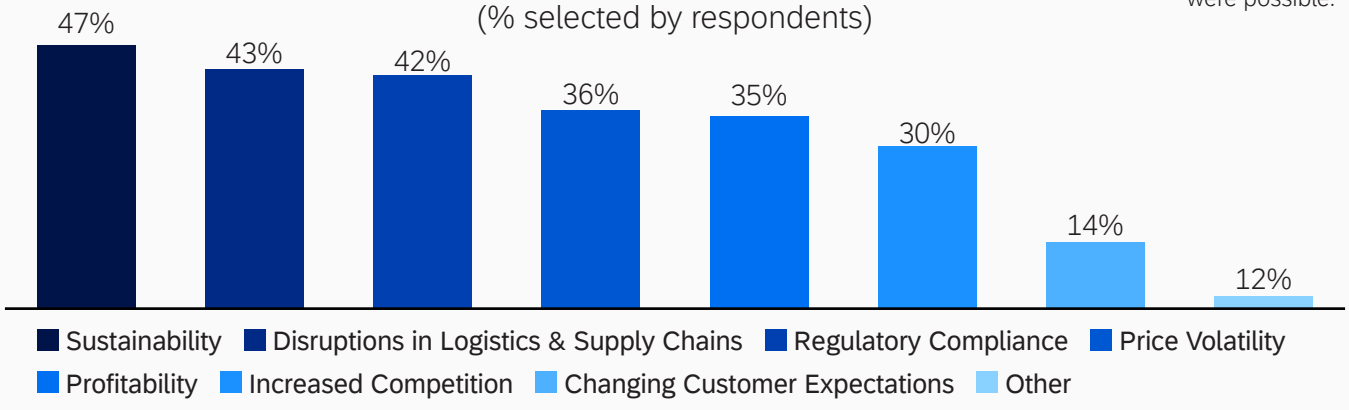
Retail demand for chemicals remains strong, and throughout the next two years, market recovery is likely across all segments. Industrial production in the US should gain momentum in 2025. As the sector consumes 85% of basic and specialty chemicals, a recovery in chemicals should precede and coincide with this. Driving long-term industrial growth are the Inflation Reduction Act, the Infrastructure Investment and Jobs Act, the CHIPS Act and a preference for domestic manufacturing and processes to protect domestic supply chains.

Despite sustainability and logistical challenges, 94% of survey respondents anticipate sector growth, mostly due to new products and services, though also due to new production capacity. The survey suggests that software – and especially software enabled with AI – is a key component in this formula for success. The finding echoes that of a 2024 survey by Americas' SAP Users Group. Almost 40% of ASUG survey participants named AI a top digital transformation technology. That's up significantly compared to the prior year.

Primary chemical industry challenges

(% selected by respondents)

Multiple selections were possible.



"The industry wants to address sustainability, regulatory and compliance issues and AI demands. But, at the same time, it is continuing to focus on core industry priorities like manufacturing and operations, supply chains and profitability," said Sergey Nozhenko, a chemical industry product specialist at SAP.

Survey results matched most of Sergey's expectations with one exception, which he found heartening – a reported appreciation for change management. Process adaptations are often needed to meet emerging requirements such as those cited in the survey, beginning with environmental impacts.

Sustainability and regulatory compliance

According to 47% of ACC SmartBrief survey respondents, sustainability is the biggest industry challenge, while 42% selected regulatory compliance as their top challenge. The responses could be seen as two sides to the same issue. They align with the results of research conducted by ACC. The association has been vocal about what it sees as heavy-handed regulatory oversight by government agencies. Including recycling, sustainability has been an industry trend for the past few years and will continue to be so, according to reports from Deloitte and McKinsey.

Almost two-thirds of ACC SmartBrief survey respondents said improving sustainability was their top priority for the next two years. Reducing the carbon footprint of chemical products is the primary focus, followed by transitioning to new energy sources and sustainable procurement. A critical capability for meeting these targets is effective data analysis. The ideal software helps users get the full picture of the carbon footprint and other key sustainability parameters. SAP offers cloud solutions such as SAP Sustainability Control Tower that support chemical manufacturers as they set targets, monitor progress and establish robust and auditable sustainability and ESG reporting.

Reporting platforms can track

- **Carbon footprint management** for real-time monitoring and analysis of carbon emissions

across the entire value chain's operations
- **Energy transition planning** by providing energy usage patterns, forecasting energy demand and tracking renewable energy integration
- **Compliance management** by centralizing data and documentation related to environmental regulations and reporting requirements. It also automates compliance monitoring and alerts companies to upcoming deadlines, regulatory changes and non-compliance issues
- **Sustainable procurement** by analyzing the procurement network so companies can source sustainable materials from suppliers whose sustainability performance is known
- **Sustainability reporting** for both internal management purposes and to meet external regulations

Supply chain and logistics hurdles

Another area requiring enhanced performance involves the industry's supply chain. Localizing it can reduce the effects of supply chain disruptions. Deloitte says geopolitical turmoil is driving onshoring, nearshoring and friendshoring. Reshaping supply chains can help meet sustainability requirements by reducing long-haul transport, thereby reducing transit-based carbon emissions. It also improves the economics of bio-based and recycled feedstocks.

Disruptions in logistics and supply chains are the worst industry hurdle for 43% of SmartBrief survey respondents. Potential solutions vary. Greater collaboration with external partners and better access to real-time data could help, with 61% and 55% respectively naming these as the best opportunities to improve. The right data-driven software can coordinate execution among the many business partners operating along the entire chemical supply chain.

SAP tools for chemical industry leaders include:

- SAP Business AI, which helps users realize the full potential of AI
- Joule, a co-pilot that guides users to solutions
- SAP Signavio, which offers embedded AI full potential of AI scenarios and capabilities
- BTP, a cloud platform to extend and personalize SAP applications
- Rise with SAP, a managed cloud offering for smooth migration

"Collaboration and data exchange with supply chain partners such as subcontractors and vendors are key to improving the supply chain," said Manoj Narang, business development manager at SAP Labs India.

Role of AI

A final, broad takeaway from the ACC SmartBrief survey is that new capabilities are attracting interest in using AI. Survey participants expect AI benefits such as:

- Data-based insights that aid decision-making (29%)
- Automation of routine tasks (26%)
- Assistance in product development (19%)

This outlook aligns with trends identified by Deloitte. Analysts note that data is becoming an important feedstock for chemical industry excellence. StartUs Insights analysts reached similar conclusions. They say that AI has a wide range of useful applications for the chemical industry and is inspiring innovative applications. Granulation equipment operation is an example of what's possible with AI-enabled chemical processing. A few years ago, SAP developed an AI-powered advisor to equipment operators with a self-learning model. It continuously forecasts conditions and suggests optimal processing parameters.

"When operators started to follow process condition recommendations, the production output increased up to 10%," Sergey said.

Predictive AI technology such as this is more useful with the arrival of generative AI, which is used in large-language models to produce answers and content satisfying specified guidelines. The technology enables the implementation of user and machine collaboration using natural language, user co-pilot assistance and report generation and insights.

This growth in computing power brought about by AI and other technologies can help solve the most vexing problems in the chemical industry. For instance, a pilot project using the latest technology to solve a complex nonlinear problem enhanced

the predictability of cracker output, the starting point for the manufacture of polymers, synthetic rubbers and more. The result showed that the technology will enable operators to maximize yields and reduce operating costs by optimizing furnace conditions in the cracking unit.

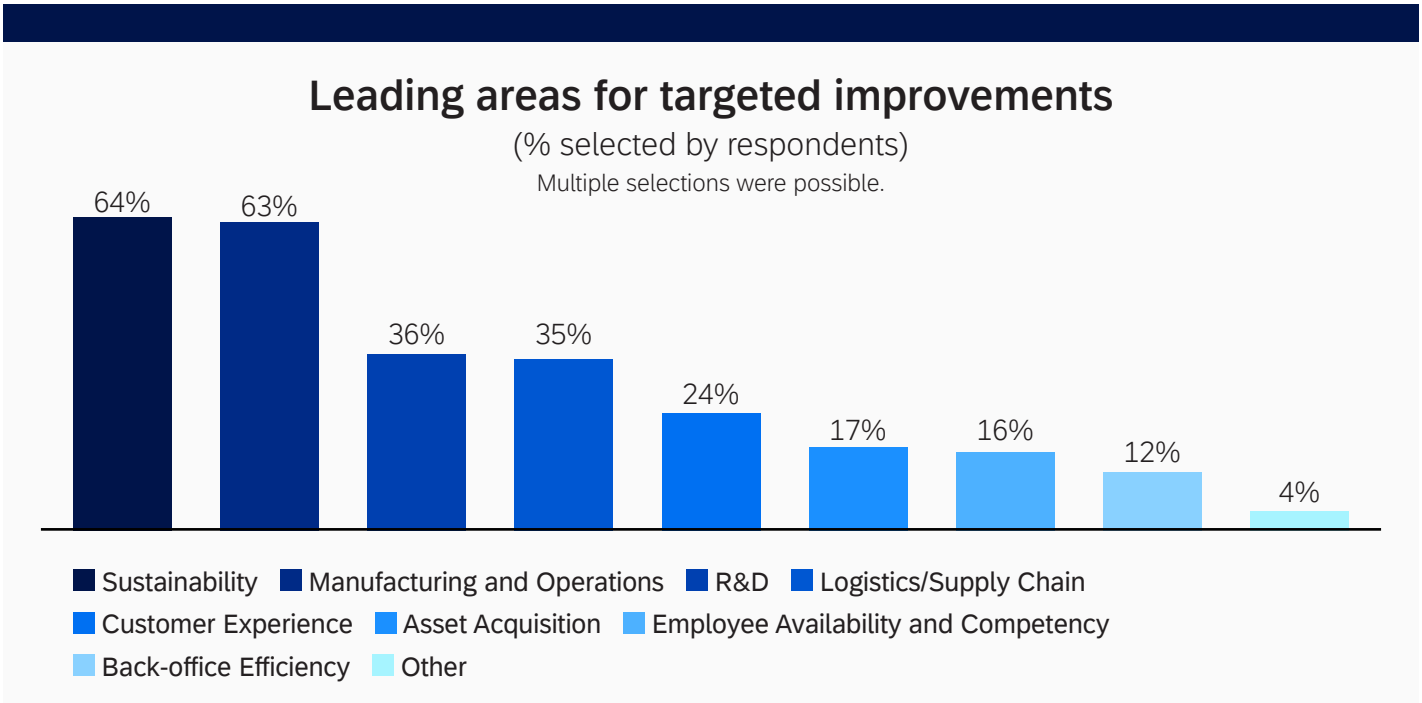
Selecting a software solution

Yet, resistance to new technology solutions remains. In the ACC SmartBrief survey, participants indicated that end-user behavior and costs are barriers to adoption. A chosen software provider should be prepared to address both inhibitors.

"Software adoption is tightly linked to usability and training. Hence, change management is essential to overcoming adoption reluctance," said Muriel Rakotomalala, a global chemicals solution manager for SAP.

Several tools can assist with change management. Sergey recommends:

- A mandatory and embedded change management workstream
- Business process management tools including step-by-step process analysis to recognize user behaviors and optimize processes
- Educational tools and content to help users



adopt systems faster
- Automated innovations such as SAP's Robotic Process Automation and GenAI Co-Pilot

SAP has deep experience helping staff members become acclimated to a new system, and understands the issues of unique importance to the chemical industry. SAP's history in the chemical industry stretches back more than 50 years. Today, 99 of the world's top-grossing 100 chemical companies run SAP.

The chemical industry faces challenges that involve sustainability and regulatory compliance, as well as supply chain disruptions – all key factors identified in the ACC SmartBrief survey. Software, particularly when AI-enabled, can help overcome these issues by improving operations and collaboration across the entire supply chain. In developing and deploying such technology, it's important to team with a solution provider with a long history in the chemical industry and proven capabilities. With the right partner and software, companies can overcome market challenges they face and thereby power growth, while meeting other immediate and strategic goals.

About SAP

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For information about SAP solutions for the chemical industry, please visit

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