



BEYOND AUTOMATION: HOW AGENTIC AI IS RESHAPING THE CHEMICAL ENTERPRISE

Abstract

Chemical companies have invested heavily in digital technologies over the past decade. However, turning that investment into faster, better decisions remains a challenge. Operational and business data often continues to be spread across multiple systems, while employee experience continues to play a critical role in connecting information and coordinating action. By working across existing systems and supporting end-to-end workflows, artificial intelligence (AI) agents can help such organizations respond more quickly, improve operational consistency, and make better use of the data and expertise they already have.

This paper examines six areas where agentic AI is already delivering measurable business value across the chemical value chain—from plant operations and supply chains to commercial functions, enterprise processes, workforce enablement, as well as research and development (R&D).

Introduction

Few industries operate at the scale and complexity of the chemicals sector. Every day, these companies balance thousands of interconnected decisions across production, maintenance, logistics, procurement, research and development (R&D), sales, and compliance.

Over the past decade, many chemical companies have made large investments in digital transformation. The Industrial Internet of Things (IIoT), advanced process control, digital twins, enterprise resource planning (ERP) platforms, and predictive analytics have given these organizations greater visibility into their operations.

However, critical data often remains fragmented, requiring valuable human effort to connect insights manually before teams can act on them. This becomes all the more challenging as experienced employees retire. Much of the knowledge that

keeps plants running efficiently was built over years on the job but was never fully documented. Drawing on years of operational data, agentic artificial intelligence (AI) can now help chemical businesses modernize further.

AI agents can work across multiple sources of information, coordinate workflows, recommend actions based on changing conditions, and execute defined tasks while keeping people in control. While agentic AI is still emerging, many organizations have already adopted AI across business functions¹, creating a foundation for more autonomous AI systems. For most chemical companies, this is a gradual shift, building on the digital systems already in place rather than replacing them. Over time, AI agents can take on more routine work, giving employees more time to focus on the decisions that need their experience.



Six Areas Where Agentic AI Can Create Measurable Value

The greatest benefit of agentic AI comes from embedding it into the core value chain rather than using it as a standalone AI application. For chemical companies, that means simplifying the decisions that shape how products are manufactured, moved, developed, and sold. While every organization has different priorities, this shift is expected to happen incrementally, one use case at a time, rather than through a single large-scale transformation. The following six areas emerge as key value drivers:

1. Running plants with greater confidence

Reliable operations are the foundation of every chemical business. Predictive maintenance can identify potential equipment issues early. But an alert is only the starting point. Agentic AI can help teams decide what to do next. When equipment begins to show signs of degradation, AI agents can connect maintenance history and planning to help determine when, where, and how maintenance should be carried out. Instead of reacting to equipment failures or relying on fixed maintenance schedules, teams can make decisions based on the wider operating context.

For instance, Infosys partnered with a leading industrial AI leader to build a solution for NOVA Chemicals. The solution provides real-time visibility into plant equipment, such as heat exchangers, while predicting the remaining useful life of individual assets. This allows maintenance teams to plan predictive and preventive work around the actual condition of equipment rather than fixed maintenance schedules.

In process optimization, improving throughput or energy efficiency has traditionally depended on engineers drawing on historical data and repeated testing. AI agents can now evaluate multiple operating scenarios in parallel, helping teams understand the likely impact of different process changes before they are implemented.

2. Building more adaptive supply chains

Chemical supply chains are under constant pressure to balance competing priorities. Different materials have different handling requirements depending on whether they are solids, liquids, gases, or classified as hazardous. Every shipment must meet strict safety and regulatory requirements, leaving little room for error. A change in production, delayed delivery, or shift in customer demand

can quickly impact decisions across the rest of the supply chain.

Infosys' SCM+.AI platform gives supply chain teams a shared view of demand, sourcing, inventory, and logistics². Building on this foundation, AI agents help teams adjust product mix, inventory, and transportation as conditions evolve, using information already available across the business. For a European agrichemical company, Infosys developed an AI-powered commodity forecasting solution to help product managers make pricing and inventory decisions. Drawing on macroeconomic and commodity-specific indicators, the solution supports scenario planning as market conditions shift. It is the kind of capability that AI agents can build on, extending forecasting into coordinated decisions across the supply chain.

3. Accelerating innovation and product development

For specialty chemical manufacturers, bringing a new product to market is often a time-consuming process. Formulations go through multiple rounds of testing and refinement before moving into patent reviews, regulatory approvals, and technical documentation.

While AI is already helping researchers explore formulation options and navigate scientific literature more efficiently, agentic AI extends that role by coordinating multiple stages of product development. Infosys' R&D+.AI platform, for example, combines an R&D Data Management Platform with Predictive Formulation capabilities to standardize research workflows and support formulation development². It also provides visualization and analytics to help teams manage regulatory compliance. These capabilities create a stronger foundation for AI agents that can coordinate activities across the product development lifecycle rather than support individual research tasks alone.

Infosys developed a document search solution powered by generative AI (GenAI) for a leading agrichemical giant. The objective was to support regulatory filing across millions of technical documents. By accurately identifying duplicates as well as optimizing document tagging and retrieval, the solution makes compliance information easier to navigate while reducing the effort involved in regulatory documentation.

Infosys' AI Research Co-Pilot solution, similarly, helps scientists work through technical documents, formulation

data, and previous research while also supporting compliance and regulatory activities³.

A recent industry survey of agentic AI for scientific discovery highlights systems that can plan experiments, coordinate specialized chemistry tools, and execute laboratory workflows with limited human intervention. One such system completed laboratory tasks more than 20% faster than manual methods while maintaining human-level accuracy⁴.

Agentic AI can also simplify intellectual property and patent reviews while helping teams prepare regulatory documentation and manage compliance requirements. By reducing the time spent on documentation and administrative tasks, it allows scientists to focus more on actual research and help bring new products to market.

4. Strengthening commercial performance and customer engagement

Commercial teams operate in a fast-changing environment. Feedstock costs, tariffs, customer requirements, and market conditions can shift quickly. Technical sales teams must also respond quickly to complex customer questions while maintaining the depth of expertise expected in the chemical industry.

Agentic AI can help by consolidating the information commercial teams need into a unified view. It can help them make pricing decisions, prepare technical responses, and keep pace with changing regulations and customer requirements. Technical sales teams can also use AI-powered assistants to respond to customer questions, generate product documentation, summarize technical specifications, and deliver multilingual support without significantly increasing operational complexity.

Moreover, recent industry studies show that AI-enabled agentic pricing tools can improve margins by more than 50 basis points, while reducing the time to realize those gains from years to weeks⁵. For chemical companies responding to changing tariffs and volatile feedstock prices, faster pricing decisions can be crucial.

5. Reinventing enterprise functions

Many enterprise functions have already integrated AI into their day-to-day operations. In procurement and finance, AI is being used to improve planning, streamline routine processes, and help with decision making. Agentic AI builds on these capabilities by connecting information and workflows across functions.





In finance, it can assist with processes such as financial planning and analysis (FP&A), accounts receivable (AR), accounts payable (AP), and general ledger (GL) activities by collecting the information needed to complete tasks more efficiently. In procurement, it can help teams evaluate suppliers, manage purchasing decisions, and respond more quickly to changing business needs. Industry research estimates that GenAI can streamline manual procurement work by up to 30% and reduce procurement costs by 15–45%⁶. Building on these efficiencies, agentic AI can coordinate information across procurement, finance, and operations.

In IT, AI agents can improve service management, software development, and routine support activities, allowing IT teams to resolve issues faster and focus on more strategic work. For example, Infosys developed a GenAI-based chatbot for a global chemical company that enables users to retrieve enterprise data through natural-language conversations. Queries are converted into SQL and information is accessed across more than 50 data lake and SQL schemas. The solution demonstrates how conversational AI can simplify access to enterprise information and reduce the effort required to retrieve data from complex systems.

This reflects a broader shift toward AI-powered enterprise assistants that help employees work more efficiently across business functions. Solutions such as Infosys Topaz are already helping organizations improve the efficiency of IT support and development while maintaining appropriate governance and human oversight⁷.

6. Preserving knowledge and empowering the workforce

Modernizing the chemicals industry requires more than just upgrading plants and equipment. It also means helping employees work more effectively, preserving operational knowledge while improving the overall employee experience.

Operators, engineers, maintenance technicians, and technical specialists make hundreds of decisions every day. Agentic AI can help by retrieving operating procedures, technical documentation, maintenance records, and expert guidance exactly when workers need them. Employees can access the information they need without searching across systems or waiting for an expert, allowing them to focus on higher-value tasks.

As experienced employees retire, organizations also risk losing decades of operational knowledge. Forecasts on the

future of work in chemicals find that as much as 25% of the industry's workforce will be eligible to retire within the next five years⁸. AI copilots can help preserve this expertise by guiding frontline workers through procedures, answering technical questions, and finding relevant documentation when it is needed.

The same technology can also simplify routine HR work,

from hiring and onboarding to employee services and workforce planning. Platforms such as Infosys' HX+.AI already provide an AI-powered foundation for employee experience⁹. Agentic AI builds on these capabilities by orchestrating information and workflows across systems, helping employees complete more complex tasks with less manual effort¹⁰.

Conclusion

A Practical Path Toward AI-augmented Operations

Chemical companies have spent years investing in digital technologies, generating vast amounts of operational and business data along the way. The next step is making better use of it.

Agentic AI helps bring information together across systems, making it easier for teams to coordinate work and make better decisions. However, it is unlikely to transform the way chemical companies operate overnight. Instead, companies need to adopt these capabilities gradually, starting with focused use cases and expanding them as confidence in the new technology grows. Over time, these individual

improvements can gradually reshape how work gets done across the business.

This shift is equally important for the workforce. With a quarter of chemical industry employees likely to retire soon, companies need better ways to preserve operational knowledge and make it available to the people replacing them. AI agents can help capture that knowledge and provide it when it is needed, reducing the reliance on individual experience alone. Ultimately, the value of agentic AI lies in making everyday work easier and helping chemical companies make better decisions as operations become more complex.





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