INTELLIGENT ENTERPRISE UNLEASHED

A perspective on the Accenture Technology Vision 2018 for the chemical industry

EXECUTIVE SUMMARY
For the chemicals sector, the picture that emerges shows an industry where executives are now beginning to embrace new tools and plan how their organizations can take part in the digital revolution.

The Technology Vision identified five key technology trends that are changing the way business and society operate. In the following pages, these trends are examined from a chemicals perspective.
Trend 1

CITIZEN AI
Raising AI to Benefit Business and Society
The use of artificial intelligence (AI) in the chemical industry is still in the early stages, but it is evolving quickly. Indeed, 80 percent of surveyed chemical executives said that it is advancing faster than their company’s pace of adoption.

In addition, 84 percent agreed that AI will work side by side with humans in the coming years, and 86 percent said that over time, AI will have the same level of impact as humans.

Chemical industry respondents most often cited AI’s potential in IT support and research and development (R&D)—at 53 percent and 51 percent, respectively—followed by security, production and operations. AI is already taking root in some of those areas, primarily in the form of pilots and limited experimental applications.

80% of surveyed chemical executives indicate that AI is advancing faster than their organization’s pace of adoption.
It is essential for companies to make sure they avoid biased data that can lead to bad decisions and recommendations coming from AI. In the survey, 92 percent of chemical industry executives said that they are confident that their AI systems will not be biased. But that confidence may not be well-founded, with more than half saying that they simply trust their vendors or IT teams to eliminate bias.

**AI is rapidly becoming more and more powerful—and that means that companies will need to have policies and practices in place to make sure that AI systems are “behaving” responsibly.**

Companies will need to build trust in the technology, and 75 percent of surveyed chemical executives seek to gain customer trust by being transparent in their AI-based decisions. But just 38 percent said that they expect to be fully transparent about AI decisions in the next two years. In addition, only 24 percent said that their employees have a full understanding of how AI systems work.
Trend 2

EXTENDED REALITY
The End of Distance
Virtual reality and augmented reality technologies—known collectively as “extended reality” (XR)—allow companies to express data in various images and 3D environments. This creates a foundation for new, richer ways to communicate over distances, across the organization and with customers.

Eighty-five percent of surveyed chemical executives said that XR will have a widespread impact over the next five years. When asked how they will use it in the next two years, respondents most often cited visualization, followed by customer service, consumer experience, product development and maintenance. Fifty-five percent expect XR solutions to pay for themselves within one year.

Today, chemical companies are especially interested in using XR in the plant—typically, to deliver information and “over-the-shoulder” coaching to people on the job. In addition, 87 percent of industry executives in the survey agreed that XR helps close the “distance gap” in servicing customers, and 52 percent expected it to be relevant in their customer-service functions in the next two years.

85% of surveyed chemical executives indicate that XR will be widespread and impact virtually every industry over the next five years.
The chemical industry is just getting started in its exploration of XR, and organizations are preparing for it in a wide variety of ways: Creating an XR strategy topped the list, followed by experimenting with the technology, building talent and researching how to apply the technology—in general, activities that underscore the early-stage, limited deployment of XR.

Finally, XR is an area where a “wait-and-see” strategy is likely to be ineffective because chemical companies will probably not share their insights and experience due to the competitive nature of this technology. Industry executives sense the need for action, with 87 percent saying it is important or very important to be a pioneer in XR solutions.

By using XR to overcome distance in the plant, chemical companies are likely to see increased efficiency and productivity, reduced costs and improved regulatory compliance.
Trend 3

FRICTIONLESS BUSINESS

Built to Partner at Scale
Partnerships are becoming more important in business, and when partnerships are technology-based, companies can build their partner networks quickly. But legacy systems weren’t built to support flexible, simplified connections.

Today, however, two key digital technologies are making it easier for companies’ systems to “talk to” each other and support collaboration. These technologies—microservices and blockchain—promise to help remove friction from intercompany interactions.

Microservices is an architectural approach that breaks down monolithic applications into a collection of component services that can be easily linked with partner systems, eliminating the need to integrate entire applications. Blockchain is essentially a shared ledger—decentralized among partners—that is used to automatically and securely store and certify transactions between parties, which helps in managing partnerships.

79% of surveyed chemical executives agree that microservices are critical for scaling and integrating ecosystem partnerships.
For chemical companies, these technologies can enhance data integrity because data can be kept in a single ledger that is distributed across nodes in the partner network, with no single point of failure. They can also make it easier to track, trace and audit information about everything from contracts to joint molecule development. And they can enable increased automation of inter-company processes. In fact, just over 70 percent of surveyed chemical executives expect that blockchain will be critical or very critical to their organizations over the next three years. Furthermore, 79 percent agree that microservices are critical for partnerships.

71% of surveyed chemical executives report that blockchain will be critical or very critical for their organizations over the next three years.

Creating a frictionless business will require the cooperation of many partners and the creation of consortiums around, for example, smart contracts or supply chain monitoring. Chemical companies will need to work with partners to establish standards and rules for working together. Thus, this is an area where being a first mover is likely to be an advantage because chemical companies will want to have a seat at the table as the governing rules for consortiums are worked out.
Trend 4

INTERNET OF THINKING

Creating Intelligent Distributed Systems
In the effort to use operational data to enable real-time decision-making, chemical companies typically send data from the plant floor to a powerful central IT system where it can be stored, processed and analyzed. But that approach increases costs and creates system latency that makes it impossible to use data for real-time operational decisions.

The answer is to move more computing power to the edge—that is, close to the equipment and assets that are generating the data. This “distributed intelligence” approach appeals to chemical industry executives, with 87 percent saying that developing real-time insights from large volumes of data will require computing at the edge. With this approach, less data needs to be stored and transmitted, reducing costs and latency.

83% of chemical industry respondents expect to see a return on their investment in edge computing within two years.
Edge computing can work hand in hand with robust, cloud-based enterprise resource planning (ERP) and analytics applications that process data and then feed information back to the manufacturing execution systems that run plant systems. Chemical companies can also analyze combined edge and historical data to create new automated decision-making models that can then be used by edge devices—allowing them to analyze and act on data in real time on their own.

Edge computing is still rare at scale in chemicals—but a majority (83 percent) of survey respondents expect to see a return on investment (ROI) in edge computing within two years. Cost savings topped the list of expected benefits, being cited by 72 percent of chemical industry respondents. But they also cited real-time data processing, operational efficiency and personalization/people-centric experiences.
Trend 5: Data Veracity

DATA VERACITY

The Importance of Trust
Data is the lifeblood of business, and 88 percent of surveyed chemical industry executives agreed that their companies are using data at unprecedented scale for critical and automated decision-making.

However, by transforming themselves to run on data, companies have created a new kind of vulnerability: inaccurate, manipulated and biased data that leads to corrupted insights and skewed decisions. As such, trusting the data is a business imperative.

Chemical industry respondents are aware of this growing challenge—8 out of 10 said that automated systems create new risks, including fake data, data manipulation and inherent bias. The same proportion said that as organizations rely more on data-driven decisions, the issue of data integrity will grow exponentially. And 33 percent said that their organizations have been the target of adversarial AI, while another 28 percent said they have probably experienced an AI attack but are unable to verify it.

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Despite all that, 94 percent of surveyed chemical executives expressed confidence in their organizations’ data integrity. However, only 25 percent said that they validate data extensively, while 42 percent perform only limited or no validation.

Chemical companies are often lacking the internal infrastructure—the governance and processes—needed to manage data integrity and address growing data vulnerability effectively. In building a data-integrity infrastructure, they should focus on three key tenets: knowing data’s provenance, or verifying the history of data from its origin throughout its life cycle; understanding data context, or considering the circumstances around the data; and ensuring integrity, or securing and maintaining data. More broadly, chemical companies can build a “data intelligence” practice focused on truly embedding and enforcing data integrity and security throughout the organization, helping to build trust in the data.
Preparing for the Five Trends

When it comes to broader implementation of new technologies, chemical companies should be ready to move ahead sooner rather than later because widespread adoption is likely to occur in the near future. This can be challenging for an industry that has traditionally moved cautiously when approaching new technology. But the opportunities are tremendous—and acting now to take advantage of these five trends will be key to keeping up in an industry landscape that is being reshaped by technology.

Research Methodology

Every year, the Technology Vision team partners with Accenture Research to pinpoint the emerging IT developments that will have the greatest impact on companies, government agencies and other organizations in the next three to five years. These trends have significant impact across industries and are actionable for businesses today.

As part of the research process, Accenture conducts a global survey of thousands of business and IT executives to understand their perspectives on the impact of technology on their organizations, and to identify their priority technology investments over the next few years. More than 6,300 IT and business executives from 25 countries responded to the latest survey, which was fielded from November 2017 through January 2018. One hundred chemical industry executives were among the respondents.
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