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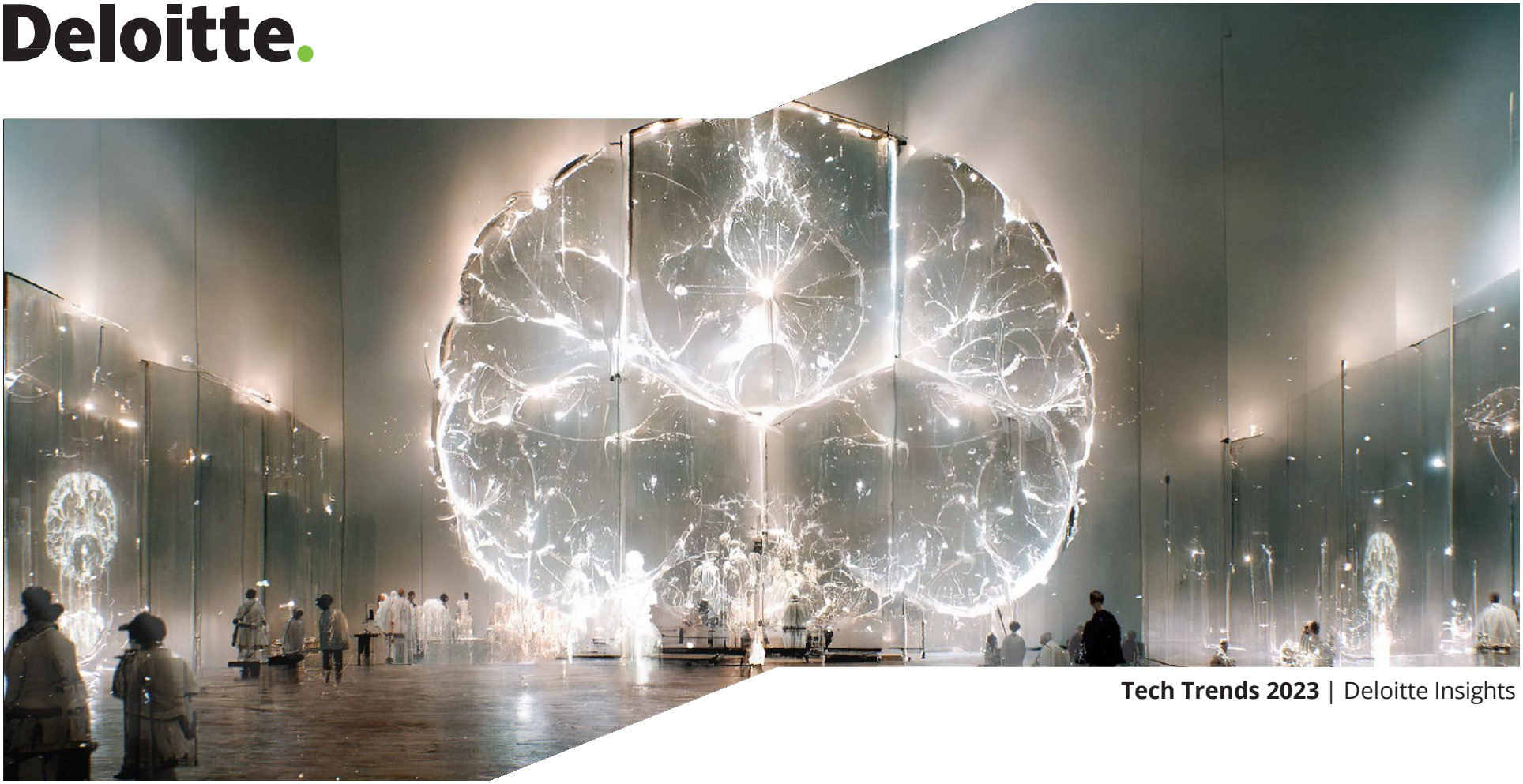

Tech Trends 2023 | Deloitte Insights

Peering at technology trends through the lens of energy and chemicals

Relevance and readiness scale:

We looked at each trend and assigned a value from one (low) to five (high) based on the trend's relevance and readiness for Energy & Chemicals adoption.

Relevance:

How impactful would it be if the E&C Industry adopted the trend?

Readiness:

How ready is the E&C industry to adopt the trend?

The technologies that enhance our organizations and our lives are more powerful (and more essential) than ever before. Forward-thinking energy and chemical (E&C) organizations are seeking to better understand the technological forces that surround them and harness them for the benefit of their customers, consumers, stakeholders, employees, and partners alike.

This report provides an E&C-specific take on Deloitte's Tech Trends 2023 report, spotlighting the accelerating technology trends most likely to cause disruption over the next 18–24 months. We explore which trends may be most relevant for the E&C industry and how ready the industry is to take advantage of them.

Throughthe glass: Immersiveinternetfor the enterprise

For a generation, the connection to the digital world has been mediated through an ever-shrinking series of rectangular screens. Now, as technologists recognize that screens can't keep shrinking forever, the paradigm is shifting again, toward interfaces that take users through the glass and into immersive virtual experiences, including the digital world known as the metaverse. Over the next couple years, tangible, conversational, and virtual interfaces will likely continue to graduate from tech to toy to enterprise tool. While some companies build lucrative business models around the unique capabilities afforded by an "unlimited reality," others provide immersive environments for employees to streamline operations or collaborate and learn. As technology advances further over the next decade, organizations should be ready for reality to move online through expanded ways of interacting with mixed reality.

Trends in action

Leveraging virtual reality (VR) technology can be a major game changer for E&C companies, which are largely dependent on critical operations at remote and hard to access sites – for instance, Oil and Gas drilling locations. The recent release of Apple Vision Pro alongside other Metaverse offerings, portends the rise of many different use cases across industries, with E&C being no exception. Enabling augmented reality (AR) access to remote sites and machines will allow experts to troubleshoot, inspect and monitor these machines easily, reducing the need to travel, enhancing safety and reducing costs. VR can also provide immersive training experiences, with the potential to develop realistic simulations of drilling and other hazardous operations – this has been seen to improve incident response capabilities.

READINESS: 1 **RELEVANCE: 3**

Opening up to AI: Learningto trust our AI colleagues

With AI tools increasingly standardized and commoditized, few businesses may realize true competitive gains from crafting a better algorithm. Instead, what will likely differentiate the truly AI-fueled enterprise from its competition will be how robustly it uses AI throughout its processes. The key element here, which has developed much more slowly than machine learning technology, is trust. As machines encroach on human-like tasks that go beyond basic number crunching and enter the realm of discernment and decision-making via AI, the business world is having to develop a new understanding of what it means to trust machines. Leading organizations are developing AI systems and inserting them into their processes with trust at the core, ensuring that all users understand how these tools work and feel they can rely on them.

Trends in action

Certainly, the recent rise of popular Generative AI tools like GPT-4, BARD, GitHub Copilot, DALL-E, etc., has caught the attention of many. Beyond Generative AI, broader AI tools can provide oil and gas companies with significant advantages by deriving real-time and prescriptive insights from the huge volumes of data that is present within this industry. For instance, AI algorithms can analyze data from sensors / OT devices to predict equipment failures and help plan and manage maintenance, which can help both Energy and Chemicals companies alike. AI can also help with better hazard simulations to take the guess work out of process hazard analysis and send automated alerts to avoid incidents, leading to better safety for industry workers. Enhancing AI capabilities while adhering to architecture and trust guard-rails, will help boost adoption.
Immersive reading: Deloitte POV on 10 ways AI can power energy, resources and industrials (See URL on page 5),

READINESS: 2 **RELEVANCE: 5**

Above the clouds: Taming multicloud chaos

As the number of cloud platforms maintained by the typical enterprise proliferated, so too did operational complexity. With multiple platforms comes multiple security protocols, applications, databases, and governance rules. To simplify multicloud management, some enterprises are beginning to turn to a layer of abstraction and automation that sits above the burgeoning multicloud. Known alternately as metacloud or supercloud, this family of tools and techniques can help cut through the complexity of multicloud environments by providing access to common services such as storage and compute, AI, data, security, operations, governance, and application development and deployment. Metacloud offers a single pane of control for organizations feeling overwhelmed by multicloud complexity, allowing them to synchronize activities across their various cloud platforms.

Trends in action

The E&C industry, which is known for its complex and geographically dispersed operations, often utilize a diverse mix of cloud platforms and data centers. As such, it is likely that many companies in this industry would benefit from centralized management and simplification of cloud and on-prem environments that a meta-cloud approach can offer. The industry has been able to simplify some of its IT infrastructure issues and streamline its operations by either utilizing products that can utilize different clouds, or by starting to use such meta-cloud platforms for management. By reducing the complexity of the IT landscape, the E&C industry can benefit significantly from increased control and visibility over cloud instances, potential for reduced costs, less vendor lock-in, enhanced data security, and improved operational efficiency.

READINESS: 2 **RELEVANCE: 5**

Flexibility,the best ability: Re-imagining the tech workforce

In the last year, many organizations have been engaged in a heated competition for a limited supply of technology talent. Yet, with technical skills becoming outdated every couple of years, hiring for current needs is not a winning long-term strategy. Rather than competing in scarcity, savvy leaders consider an abundance frame, wherein technology talent can be curated, created, and cultivated. Companies should be prepared to eschew IT orthodoxies and prize flexibility as the best ability. By building a skills-based organization, tapping into creative sources for finding talent, and providing a compelling talent experience, companies can meet their talent goals. In the longer term, organizations should plan to brush up on their humanities as AI technology advances enough to carry out many of the lower-order tasks that IT teams are burdened with today.

Trends in action

As the E&C industry is undergoing a significant level of digital transformation, finding the right talent is becoming a greater challenge. In order to address this challenge, organizations will need to adopt innovative strategies to attract and retain this talent. Whether it's certification-based programs, flexible work arrangements, delivery pods sourced from strategic partners, or utilizing innovative operating models. The E&C industry should foster an organizational culture that recognizes and rewards technology talent who demonstrate impact, as well as the agility and resilience needed to effectively navigate change, both now and in the long term.

READINESS: 3 **RELEVANCE: 5**

In us we trust: Decentralized architectures and ecosystems

Blockchain-powered ecosystems are becoming key not only to developing and monetizing digital assets but also to creating digital trust. As organizations begin to understand blockchain's utility, they're realizing that building stakeholder trust could be one of its primary benefits. From everyday enterprise applications to blockchain-native business models, blockchain-enabled architectures and ecosystems disintermediate trust, placing it not in a single person or organization but distributing it across the community of users. Organizations may be able to cement their credibility by helping reinvent a more decentralized internet, Web3, in which a single, immutable version of the truth is based on public blockchains. In this world, digital natives are increasingly likely to demand higher-quality proof and higher-order truth. Digital ledger technologies and decentralized business models that achieve consensus through code, cryptography, and technology protocols are demonstrating that none of us is as trustworthy as all of us.

Trends in action

As blockchain adoption continues, E&C companies are seeking to identify valuable use cases, such as automating and reengineering processes within functions and across-functions, based on Blockchain-powered ecosystems. Some in the industry are discovering value through implementing Blockchain-based distributed ledger systems seamlessly integrating their organization's supply chain. Others have found opportunity in leveraging blockchain to facilitate adoption of sustainable fuels in transportation and validation of carbon credit programs. By enabling a blockchain-based ecosystem, the E&C industry can benefit from strengthened trust across stakeholders, streamlined operations, increased transparency in carbon markets, and improved emission tracking of nature-based solutions.

READINESS: 2 **RELEVANCE: 3**

Connect & extend: Mainframe modernization hits its stride

Most businesses today feel that their legacy systems (like mainframes) are performing well on the types of workloads they were originally designed to do. The problem is that the business and technology environment has moved on, leaving business leaders expecting more functionality from their IT systems. Rather than rip and replace legacy core systems, enterprises are increasingly looking to bring them into the modern era by connecting and extending them to emerging technologies. Through tried-and-true approaches to legacy system modernization, businesses are leveraging things like mainframes—and their precious data—to drive digital transformation. AI-powered middleware solutions, advanced microservices applications, and refreshed user interfaces are giving organizations a powerful pairing that takes advantage of the trusted functionality of legacy systems and the expansive capabilities of emerging technologies.

Trends in action

Many E&C organizations rely on "legacy assets" that have effectively supported their operations for decades. However, integrating these legacy systems with modern computing platforms presents a challenge. To address this challenge, organizations should explore new data integration technologies, such as AI-powered middleware, which enable a more progressive approach to modernization. Some E&C companies have found these high-performance data integration capabilities to help bridge the gap by replicating changes in real time on mainframe systems to cloud data platforms and on-premise databases. Additionally, some organizations are considering leveraging hyper-scaler capabilities to modernize their systems in place. These strategies enable incremental service improvements, significantly reduce migration risks, and provide a competitive advantage through the utilization of modern analytics platforms.

READINESS: 3 **RELEVANCE: 5**

Widening the aperture: From infoTech to xTech

Historically, to enterprise audiences, "technology" has served as shorthand for information technology. But separate and distinct from enterprise IT, an extended set of technologies—or xTech—is on the horizon. Rooted in the formal, natural, and social sciences, these academic and research areas are brimming with patent and startup activity, technology maturity and advancements, academic and grant investments, and venture capital funding. And they're attracting the best and brightest talent. We anticipate six emerging technology disciplines to eventually rival IT in their impact on business innovation: space and aeronautical engineering; cellular and biomolecular engineering; brain and nervous system applications and interfaces; climate, sustainability, and the environment; autonomous and precision robotics; and power, energy, and battery technologies.

Trends in action

E&C organizations use, develop on, and manage many of the technologies that are changing our world. Finding the right balance of seizing new opportunities while preserving safety has never been more challenging, or more important. Whether it's the path towards a sustainable climate through tech, or the future of the environment, E&C organizations must act to apply funding, policies, and more to make sure the future is better and brighter than today.

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