

**Deloitte.**



**2023 chemical  
industry outlook**

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## About the Deloitte survey

To understand the outlook and perspectives of organizations across the chemical industry, Deloitte fielded a survey of over 100 US executives and other senior leaders in August 2022. The survey captured insights from respondents in four specific industry segments: commodity chemicals, specialty chemicals, agricultural chemicals, and consumer products.

# ‘Rebound’ vs. ‘Reset’: Have we reached the next frontier for the industry?

## State of the industry

As the US chemical industry transforms itself by adjusting portfolios, retooling supply chains, and advancing material innovation, 2023 will set the stage for a reset in terms of materials transformation. The significance of this reset lies in and is driven by changing customer requirements, which include products sold, and extends as far back as pathways and feedstock choices. This transformation is needed to meet the clear imperatives for circularity, decarbonization, and sustainability. Further, the disruption experienced in the past 18 months has demonstrated the need for localization of supply chains and the balance between efficiency and resilience. The path forward in the coming year may mark the start of the shift from scaled, global, and efficient production to sustainable, resilient, and increasingly regional production pathways. For the world to achieve noticeable reduction in climate change, chemical producers globally will likely continue to play a critical role, as chemicals and materials are the building blocks in today's global economy. These changes cannot happen immediately, but decisions made today could be pivotal, potentially setting the stage for the coming transformation in the US chemical industry.

## Headwinds affecting the chemicals transformation

The racecourse on which US chemical companies run has been dramatically altered in 2022, with energy price volatility, new government policy, economic uncertainty, supply chain disruption, and geopolitical tensions informing executives' decision-making every day. In 2023, chemical industry executives will need to find the balance between navigating these immediate challenges and positioning for longer-term growth with technological innovation, evolving customer preferences, and supply chain resilience. Many US chemical companies have stewarded a good “war chest” for these uncertain times. They could leverage their strong balance sheets to capitalize on future growth opportunities the economic uncertainty and disruption present. As an industry, chemical companies in the United States have performed well in recent years with advantaged feedstocks and strong demand. In general, balance sheets are strong; they have had good profits, a healthy cash flow, and have made balanced and disciplined capital investments.

Further, chemical producers can play a crucial role in effectively tackling climate change. Chemicals and materials are ubiquitous in a modern-day lifestyle, and for chemical producers to operate in an evolving global geopolitical landscape, there will be a strong need for fundamental changes to be made, either proactively or reactively.

Amid the potential headwinds of 2023, Deloitte is tracking progress on several longer-term trends:

- Fifteen technologies can abate 90% of industry emissions, and the pace is accelerating. Energy transition is gaining more clarity.
- Portfolio cleanup will continue—some will be limited based on macro challenges, and some companies with balance sheet strength may see opportunistic deals. The M&A environment is transforming from physical and business assets to new growth areas with sustainable technologies and services.
- Supply chain performance has achieved new importance, and companies are rearchitecting for the future with agility, security, resilience, and efficiency.
- Digital technology is being viewed as a strategic discipline, which can create value through treating emerging technologies as a risk-adjusted portfolio. This approach can drive further value chain improvements and enable a more sustainable chemical industry.

The US chemical industry has shown strong financial performance, reaching a level last seen more than two decades ago. This performance is a result of strong commodity markets and robust demand. Except for 2020, these two factors have generally created an environment of favorable pricing, allowing the industry to recover nearly all the gross margin erosion that occurred through 2015—almost 700 basis points.<sup>1</sup> Moreover, the industry is currently seeing the best EBITDA (earnings before interest, taxes, depreciation, and amortization) performance in more than 10 years due to limited expansion of absolute SG&A (selling, general, and administrative expenses).<sup>2</sup>

## Macroeconomic indicators

However, several macroeconomic indicators signal uncertainty in the global economy heading into the coming year: volatile energy prices, higher costs, and fracturing of trading patterns amid geopolitical tensions.

**Global inflation.** Globally, inflation has been a major concern, which has led to aggressive central bank policies to raise interest rates. For instance, the US Federal Reserve has increased rates by more than 300 basis points to control inflation, and other central banks are taking similar action.<sup>3</sup> Given the global nature of the industry, weaknesses in key markets such as China may well have a sizable impact, given industry reliance on those markets and the reciprocal nature of trade.

**Continued weakening of GDP growth.** Slowing GDP growth in China is possible—Q2 2021 was near 1.5%, but Q2 2022 fell to between -2.5% and -3%, primarily due to the zero-COVID approach and lockdowns.<sup>4</sup> These developments are having a ripple effect on demand, particularly as US chemical consumer prices have risen in line with inflation. For instance, the Bureau of Labor Statistics and the American Chemistry Council (ACC) chemical price index currently stands at 101.7, compared to 119.5 in 2020.<sup>5</sup>

**Falling consumer confidence.** The EU consumer confidence index has fallen from a pre-pandemic level of 104 to 97 in the second half of 2022.<sup>6</sup> Multiple Europe-based producers cited in their Q2 earnings results that they expect further market decline. In other regions, end-market demand is also weakening. For example, sales in the US automotive industry were down from 18.8 million in April 2021 to 13.8 million in July 2022,<sup>7</sup> partly due to supply chain issues such as the chip shortage. But as energy and food prices have risen, consumer spending is expected to slow.

**Oil price volatility.** Russia's invasion of Ukraine drove oil prices to new highs. The Brent price averaged \$107 per barrel in the first half of 2022, significantly above the \$65 per barrel average for the prior-year period,<sup>8</sup> impacting the financials of several global chemical producers. While oil prices have softened somewhat in the third quarter of 2022 due to reduced demand and economic concerns, the impact of this price volatility will continue to be felt.

**Tight global gas markets.** In the first half of 2022, spot prices at the Dutch Title Transfer Facility (TTF)—the central gas trading hub in continental Europe—averaged €99/MWh. This compares to €22/MWh a year earlier.<sup>9</sup> With volumes to Europe via Nord Stream only at 20%<sup>10</sup> over much of the summer and reduced to zero in the fall, prices have remained high. In the United States, average natural gas prices at Henry Hub almost doubled in the first half of 2022 compared to the prior year—from \$3.40 per million British thermal unit (MMBtu) in H1 2021 to \$6.41 per MMBtu in H1 2022.<sup>11</sup> In August, Henry Hub prices neared \$10/MMBtu for the first time in years. And the spot LNG benchmark for North Asia, the Japan-Korea Marker, was \$52 per MMBtu in July 2022, more than triple the level in July 2021.<sup>12</sup>

**Impact on feedstock dynamics.** With limited incremental OPEC+ (a group of 23 oil-exporting countries that meets regularly) supply, the economics of sales of discounted Russian crude to Asian buyers could shape the economics for Naphtha-based olefins. This situation has not yet fully cascaded into trade balances in the flow of polymers globally. Two specific watch points for H2 2022 that will inform feedstock prices in 2023 will be the natural gas supply situation in the EU through the winter and the ability of OPEC+ to expand supply. Either of these could significantly alter feedstock economics, causing a ripple effect through the chemical value chain.

**Climate change.** The growing impact of climate change and the regulatory response have been highly evident in 2022. For instance, the summer heat and drought in Europe, the United States, and China, as well as the unseasonably heavy floods in several countries, have created significant economic disruption. These events have affected the industry, as industrial operations in Sichuan, China were shuttered, and several European waterways dramatically reduced shipping. The impact of extreme weather is compounding already tenuous and stretched supply chains.

These headwinds will continue into the coming year, meaning chemical executives will have to find the balance between addressing immediate challenges and positioning for growth amid longer-term economic and consumer trends. How companies strike this balance will make 2023 a pivotal year setting the stage for the coming transformation of the chemical industry. Will this upcoming year be a “rebound” or a “reset” for the industry?

# 1

## Sustainability and innovation

### Integrating innovation and sustainability to move beyond abatement

**Many chemical companies** have already committed to significant emissions reduction targets. About 70 global chemical companies have net-zero or carbon-neutrality targets set for 2050, which will require considerable and immediate work.<sup>13</sup> Chemical producers need to focus on their stated objectives of emissions reduction to meet their 2030 goals, starting with Scope 1 and 2 emissions and, in many cases, driving noticeable reductions across Scope 3 as well. And to impact the larger ecosystem, these efforts should reach beyond abatement to harness material or product alternatives on a larger scale. According to Deloitte’s previous research,<sup>14</sup> there are 15 technologies that are crucial to emissions reduction that range from abatement (carbon capture and sequestration [CCS]) to reducing fossil-fuel use with renewables, nuclear, hydrogen, and alternate fuels to decarbonizing feedstocks (circular, bio, and alternate feedstocks). Although there has been rapid advancement in these technologies in the past 18–24 months, the challenge now is to move these technologies out of the pilot phase and accelerate their broader application and adoption.

**Deloitte’s outlook survey** points to a clear and present challenge: Any scale capital deployment for sustainability in the near term may be at lower-than-threshold hurdle rates yet may require a larger share of capital deployment. Survey respondents cited that the majority of the challenges with ESG (environmental, social, and governance) implementation are associated with a lack of low-carbon alternatives or the cost of abatement. In essence, a new capital allocation bucket needs to be created—“sustainable capital”—in addition to maintenance and growth capital.

**As evidenced by an increased number** of sustainability-related announcements in 2022, this shift is already underway across bio-based productions, alternate lower-emission pathways, and circular economy pathways. Each of the announcements is starting to push scale production for materials to above 50 kilo tons per annum, moving out of the pilot phase.

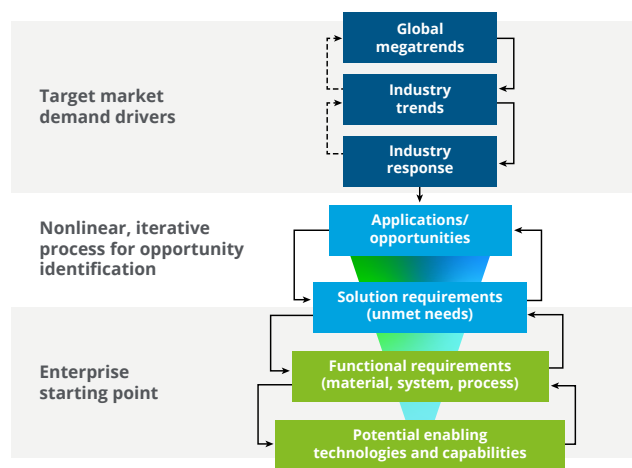
**However, many of these solutions remain regional** in nature and implementation, lacking the scale required to completely repudiate fossil fuel-based production of materials. The global production capacity of bioplastics is anticipated to grow by around 11%,<sup>15</sup> whereas mechanical recycling may grow at closer to 12%–13% by 2023.<sup>16</sup>

**The new US industrial policy** being forged through the Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA) signal policy support for innovation and for investment in lower-emissions technologies. For example, these regulations provide billions of dollars for investments in lower-emissions technologies along with continued tax support for carbon capture

through the 45Q (tax credit) program.<sup>17</sup> The IRA also includes changes in requirements for downstream industries that will prompt companies to reexamine the location of suppliers and the quality and functionality of materials supplied by the industry. Achieving the desired outcomes and results, however, will likely require additional capabilities and approaches beyond those necessary for the invention of new materials.

**For example,** system-level design and engineering will be a core capability necessary to leverage combinations of both new and existing materials and process technologies. Furthermore, new business models, together with new approaches to partnerships and collaborations that extend well beyond current concepts of “open innovation,” will likely be essential to create and grow new businesses based on functional solutions. The advanced materials systems (AMS) framework (figure 1) is, therefore, a call to action for players in the advanced materials ecosystem to rethink conventional strategies and approaches for creating innovation and growth. The result is that chemical and specialty materials companies are poised to lead a more efficient, effective, and sustainable use of materials. How these companies weather the challenges of the next 12 months will determine the pace of this transformation.

**Figure 1. A simplified view of the advanced materials systems (AMS) approach to materials innovation**



Source: Deloitte analysis.

In March 2022, the US Securities and Exchange Commission (SEC) proposed a new rule that would require public companies to disclose annually certain climate-related financial statement metrics, information related to climate-related risks, and greenhouse gas (GHG) emissions in public disclosure filings.<sup>18</sup> If these rules are finalized and effective during this calendar year, they could begin to be phased in as early as 2023.<sup>19</sup>

# 2

## Portfolio transformation

### Near-term portfolio action positions the industry for long-term transformation

**Heading into 2023**, the US chemical industry is in a strong financial position. Enterprise value (EV)/EBITDA multiples for the global chemical industry have further normalized to historical patterns around 8–10X,<sup>20</sup> from record highs of the COVID years (figure 2).

**Figure 2. EV/EBITDA multiples for global chemical producers**



Source: Deloitte analysis of publicly listed global chemical company data sourced from S&P CapitalIQ.

**The industry has also reduced cyclical** and increased attractive exposure to end markets. In many cases, the industry is poised as the natural owner of downstream climate solutions with chemical engineering and chemistry capabilities.

**Despite these factors, M&A activity has slowed through H1 2022.** This trend culminated in a 10-year high in 2021 and then declined in 2022. Deal volume in H1 2022 is down 21% relative to 2021<sup>21</sup> as credit markets have become tighter than they've been in years, with interest rate increases exacerbating price volatility. Private equity (PE) volumes are down from 2021 but still on par with pre-2021 levels. Tighter credit markets are affecting PE appetite for deal-making in 2022 as deal volume in H1 2022 is down 50% compared to H2 2021.<sup>22</sup>

**Over the past decade**, deals were predicated in part on three characteristics: first, the right owners for the right assets (both physical and business assets); second, the notion of the right to operate or be the natural owner of the asset; and third, a regional or product line extension of the portfolio (e.g., the Aramco LANXESS deal<sup>23</sup>). [ML3] Several major deals over the past decade were enabled by shareholder activist action on unlocking shareholder value, especially in the United States, that allowed PE players to take on a number of spin-offs and carve-outs. However, with the current high-interest-rate environment and weakness in the capital markets, a slowdown in net new deal activity by PE firms is expected. In some cases, PEs are building portfolios (e.g., Vibrantz Technologies Inc., formerly Prince Materials<sup>24</sup>) as opposed to the traditional PE playbook. This suggests that the uncertainty in the market continues to overshadow lower multiples and strong balance sheets.

**Further, 2023 points to a muted and very targeted portfolio-tweaking environment.** PE buyers could face a challenging environment unless there is a change in the credit structure. Given the nature of capital required to build sustainability solutions and the nascency of the available technologies, a restructuring of the objective of capital is possible, and new reasons for acquisitions may emerge. The M&A environment is transforming from physical and business assets to new growth areas with sustainable technologies and services.

**2023 could be a turning point** where chemical companies emphasize the long-term viability of product portfolios in the context of sustainability in a move toward asset-oriented deal-making. This trend will take longer to scale, given the uncertainty around feedstock prices, energy demand, supply chain, and end-market demand, affecting the appetite for strategic buyers. But the foundations for this shift are already being laid in the current environment.

# 3

## Supply chains

### Rearchitecting to balance costs, carbon footprint, and resilience

#### The pandemic revealed the fragility of supply chains,

primarily through distribution issues for the chemical industry. The ACC survey of chemical manufacturers doing business in the United States<sup>25</sup> highlighted the following:

- 55% of chemical manufacturers reported port-related delays and congestion have worsened since Q3 2021.
- 39% of chemical manufacturers reported rail transportation-related delays and service challenges have worsened since Q3 2021.
- Many rail users reported longer transit times, typically about eight days longer, with some companies reporting an increase of more than three weeks.

#### Given the truly globalized nature of the chemical industry

and the high dependence on fossil fuel-based pathways, global trade has been a major consideration for the industry. Pre-pandemic global exports for the industry were \$2.1 trillion, and global imports were \$1.8 trillion, with the United States being a major exporter driven by the shale advantage of the past decade. For the past three decades, chemical industry supply chains have been built to achieve the lowest feedstock costs. Invariably these feedstocks have been fossil fuel-based, or raw materials that are highly localized in certain geographies (e.g., phosphate, palladium, or lithium).

#### However, the pandemic and extreme weather events

between 2020 and 2021 stress-tested many supply chains globally to the point of breaking. Chemical supply chains fared better than most, experiencing fewer bottlenecks but still suffering disruption. For the chemical industry, weather drove supply-side shocks as well, with production shutdowns and disrupted supply chains. One response to this disruption has been the creation of new feedstock systems that are largely local (bio-based/recycling) and which offer sustainable alternates through material innovation. However, resiliency will need to be balanced with the emergence of sustainability hubs (such as CCS and hydrogen), which may help solve the economies of scale challenges and reduce costs.

**In addition to market factors,** there are also regulatory influences at play. For example, the CHIPS and Science Act of 2022 has helped jump-start investment in additional semiconductor production capacity in the United States.<sup>26</sup> Similarly, there are provisions within the IIJA and IRA that could help scale battery assembly and battery materials production back to the United States. This new industrial policy in the United States is increasing

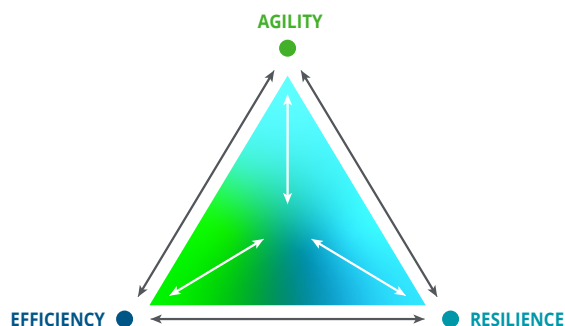
the need for original equipment manufacturers (OEMs) and other downstream industries to reshape their bill of materials to be more sustainable and, in some cases, more local.

**And, now with geopolitical uncertainty,** the industry is seeing the recent shuttering of plants in Europe; another challenge for supply chains to absorb. Over the coming year, reevaluating supply chain structures will be critical for producers to meet the scale of changes required for the next decade from:

- a. Localization of supply chains to further achieve decarbonization goals while building resiliency and redundancy, and
- b. Further incorporation of ESG-related product portfolio changes, moving to circularity and alternate feedstocks and reshaping trade flows.

**In the post-pandemic world,** successful supply chains will find a balance among three imperatives: agility, efficiency, and resilience. While cost remains a concern, the past two years have exposed the vulnerabilities in over-indexing on efficiency. But building resilience to withstand whatever shocks come next requires an investment that may be at odds with an efficiency-first mindset. Adding agility will require a tripolar strategy. To manage external challenges, supply chain leaders need to be well-equipped and strike the right balance between agility, efficiency, and resilience (figure 3). Overall, supply chains will need to balance costs and carbon footprint while managing resiliency—a tough act that will require companies to consider strategies markedly different from the past three decades.

**Figure 3. A new tripolar strategy—the agility-efficiency-resilience framework**



Source: Jim Kilpatrick, Paul Delesalle, and Adam Mussomeli, "The new supply chain equilibrium," Deloitte Insights, April 1, 2022.

# 4

## Digital

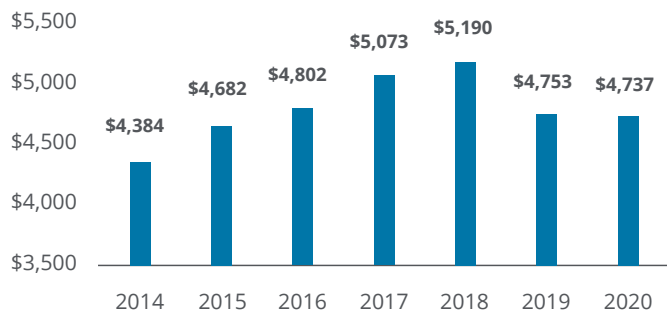
### Emerging technologies drive value chain improvements and sustainability

**With the evolution of digital technologies** over the past decade, a number of major chemical producers have embarked on various digital journeys across the spectrum—either investing in the digital core or conducting targeted pilots. The industry has been expanding to digital customer experience, using mobile devices for interaction, deploying predictive analytics for information, and enabling cloud architectures for computation. These investments over the past five years have been instrumental in establishing the business case for digital.<sup>27</sup>

**This digital foundation** enabled the industry to essentially migrate to a virtual setting through the pandemic and operate effectively through disruption. Given the uncertainty in the marketplace, investments in the near term facilitate scaled monetization of prior digital investments. For example, companies are utilizing more cognitive automation, including better decision-making, which also solves many talent challenges faced by the industry. Similarly, the focus is on the utilization of virtual reality (VR) for employees, customers, suppliers, and partners to drive operational excellence.

**Digital implementation is changing** the decision-making landscape of chemical producers (figure 4). However, the near-term focus will be on stabilizing current platforms and capabilities, with the intent to monetize the current investment pool before expanding to newer areas. For example, digital sales channels in US chemicals have largely been stagnant in the \$4.5 billion to \$5 billion range,<sup>28</sup> and scaling this will be critical for the industry. Looking ahead, market indicators signal that digital-related expenditures will range between \$7 billion and \$10 billion for US-based chemical companies through 2030.<sup>29</sup> This would represent less than 1% of revenue in a rapidly digitalizing world.<sup>30</sup>

**Figure 4. Digital economy real gross output in US chemicals (\$ million)**



Source: Deloitte analysis based on data from US Bureau of Economic Analysis (BEA).

**Targeted investments in 2023** will likely focus on end-to-end supply chain management and visibility. Producers may increasingly use digital technologies to empower materials innovation and expedite low-cost formulations by evaluating, optimizing, and assimilating ingredient recipes and domain knowledge. In addition, digital implementation will be important with end customers. Deloitte research shows that customers are, on average, 34% more likely to buy and 32% more likely to renew a contract with business-to-business (B2B) leading suppliers that master customer experience.<sup>31</sup> Furthermore, these changes will be essential to support increasing sustainability and transparency across the value chain.

**These advances represent the progress by chemical companies** on the smart factory journey. The smart factory of the future for the chemical industry converges the OT, IT, and IIoT systems leveraging Industry 4.0 and integrates supply chain and operations siloed across planning, scheduling, manufacturing, logistics, and asset management operations execution functions. The resulting integrated operations facilitate dynamic and collaborative response and resolution of real-time adverse operations events for optimal value realization across the value chain.

**Chemical companies have an opportunity to take a leap forward:** not just to implement point solutions, but to modernize and transform their end-to-end supply chain and manufacturing operations leveraging best-in-class digital-enabling capabilities, processes, platforms, and the supporting organization. Done effectively, the next steps in this transformation will lay the foundation for continuous improvement, innovation, and value realization.

**Another area is blockchain,** which may yet find a home in the chemical industry. The industry has a need to communicate verified, confidential information throughout product life cycle analysis (LCA) for its products to its customers as well as to report emissions. There is likely to be increased application of blockchain throughout the materials value chain to help ensure the source of supply, carbon measurement, supply chain security, and circularity. This will be similar to what other industries, such as financial services and automotive, have experienced to shorten value chains. Blockchain and enhanced digitalization, along with other actions taken in M&A (e.g., product technology), digitalization, customer-centricity, predictive analytics, and collaboration, will likely continue to improve the materials value chain and create additional value add for the industry. Amid these innovations, leaders may increasingly view emerging technology investment as a risk-adjusted portfolio.



# Chemicals transformation is coming—2023 could help set the stage

The disruption of 2022 has helped set the stage for the coming transformation for the chemical industry. It has become critical for companies to address supply chain vulnerabilities, even while addressing the imperative for decarbonization and circularity. Chemical companies in the United States have emerged from 2022 well positioned to take advantage of these changes by using their strong balance sheets and financial discipline. They have the means to adjust their portfolios, retool their supply chains, and anticipate evolving customer preferences in the coming year. But most significantly, the industry is well placed to lead the coming transformation that will substantially alter chemicals businesses and adjacent businesses in the decade ahead. The decisions taken by these companies in 2023 could set the pace for this systemic change.

# Let's talk



**David Yankovitz**  
US Chemicals Leader  
Deloitte Consulting LLP  
[dyankovitz@deloitte.com](mailto:dyankovitz@deloitte.com)  
+1 216 589 1305



**Amy Chronis**  
Vice Chair – US Oil, Gas &  
Chemicals Leader  
Deloitte LLP  
[achronis@deloitte.com](mailto:achronis@deloitte.com)  
+1 713 982 4315



**Kate Hardin**  
Executive Director  
Deloitte Research Center for  
Energy & Industrials  
Deloitte Services LP  
[khardin@deloitte.com](mailto:khardin@deloitte.com)  
+1 617 437 3332

## Key contributors

**Krishna Raghavan**, managing director, Deloitte Consulting India Private Limited

**Aijaz Hussain**, senior manager, Deloitte Research Center for Energy & Industrials, Deloitte Services LP

**Ankhi Biswas**, analyst, Deloitte Research Center for Energy & Industrials, Deloitte Services India Private Limited

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