



# Future of the Chemicals Value Chain in Europe

Update 2021



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# Introduction

Exactly two years ago, Monitor Deloitte and the Center for the Long View developed four plausible scenarios of what the future of the chemicals value chain in Europe could look like by 2040 (Monitor Deloitte: Future of the chemicals value chain in Europe; What will the European chemicals value chain look like in 2040?). The continued shifts in the social, technological, economic, environmental, and political contexts have led to the chemical industry experiencing exponential change and undergoing significant transformations on numerous fronts.

Like many other industries, the global chemical industry has seen unexpected developments over the last years. The COVID-19 pandemic and the following economic turbulence hit industries that were already wrestling hard with longer-term challenges. The consequences of political developments such as the relationship between China and the US or Brexit were already impacting the chemicals value

chain but have now become noticeable and continue to have a significant impact on the overall industry. On the other hand, we have seen clear progress in research, development, and innovation. This includes the development of the lithium-ion battery that has shaped and created our rechargeable world. Other elements that have gained traction more recently are the aspect of diversity and inclusion within the chemical industry and the challenges the industry faces in terms of attracting and retaining talent.

Given some of these significant developments over the past two years, Monitor Deloitte has reflected on the scenarios that were developed and the drivers and uncertainties shaping the future of the chemicals value chain, assessing their development and validity in current times. Although we are still confronted with some of the same uncertainties, we have been able to identify a trend in the direction in which the chemical industry is developing in several areas.

# Methodology and approach

The original study assessed the most impactful trends and forces that affect the chemicals value chain in Europe in the long term by combining a variety of research approaches. Drawing on traditional and artificial intelligence-based research, expert interviews, and extensive experience working with major chemical players, we identified, analyzed, and clustered the 100 most effective trends and driving forces that likely continue to affect the chemicals value chain in Europe.

We assessed these drivers in terms of their impact and level of uncertainty, which we measured based on how strongly opinions diverged on the outcome of a driving factor. Each driver has two extreme endpoints, which were used for the assessment.

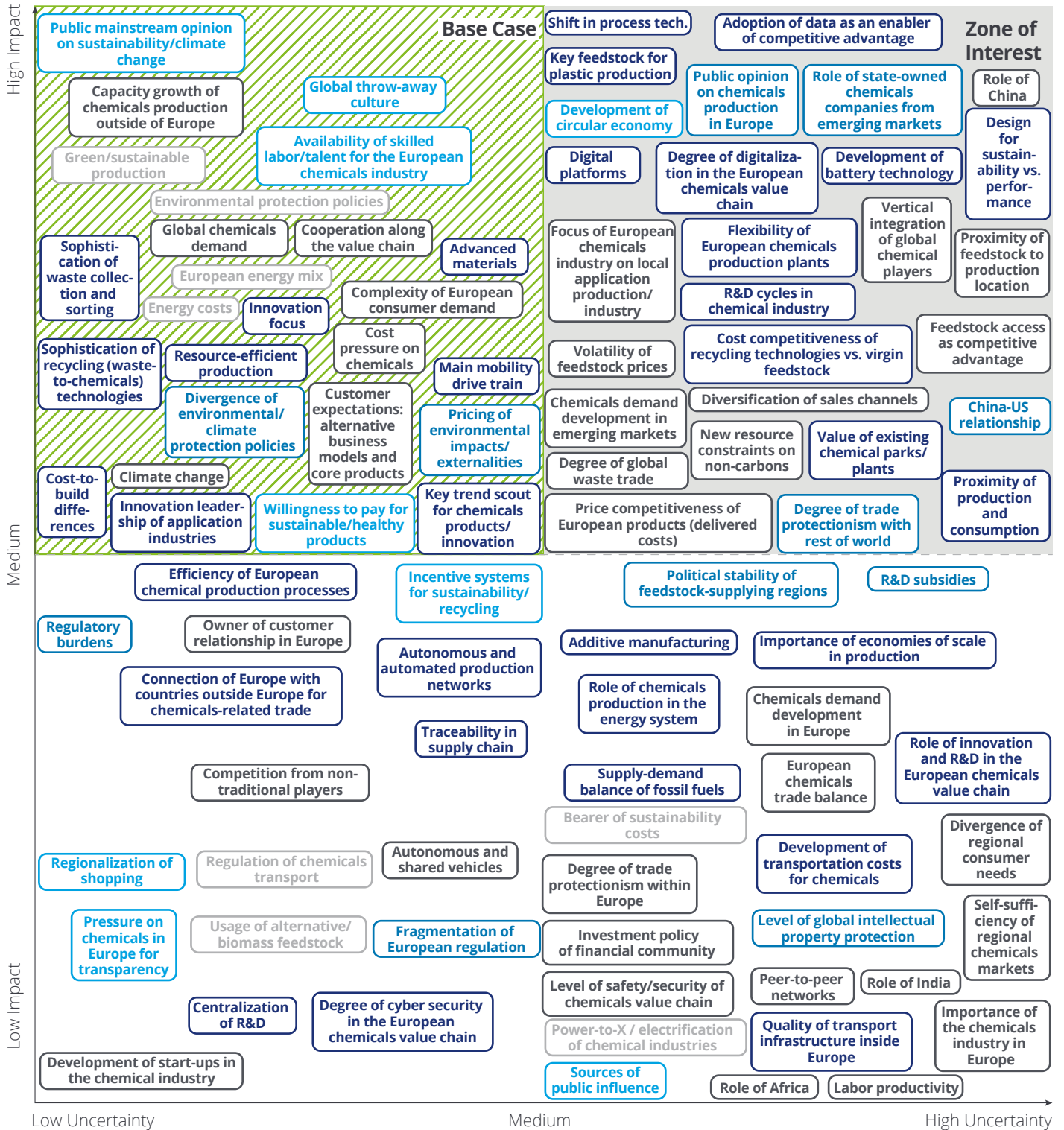
Some of these drivers were then classified as critical uncertainties with the potential to tip the balance in one direction or

another. These critical uncertainties had two fundamental characteristics – they had an unusually high impact and were uncommonly uncertain or volatile. These uncertainties formed the “zone of interest”.

But other identified driving forces were not uncertain and some might have already been predetermined. These were the trends already in the pipeline, unlikely to vary significantly. They formed the “base case” in our matrix.

Our analysis of the original base case revealed that several drivers and uncertainties have changed over the last two years. Thus, we took a closer look at selected drivers of the base case and how they have developed across our axes.

Fig. 1 – Critical uncertainties



■ Technological ■ Social ■ Political ■ Economic ■ Environmental

# Development of key drivers/base case



## Global chemicals demand and cost pressure on chemicals

The global chemical industry has experienced a significant decline in demand over the past year and has seen negative growth in production volume of roughly -3.5% in the US and roughly -1.9% in Europe in 2020. As a result, the chemical supply chain recorded a high volatility in outputs leading to both shortages and an oversupply of raw materials and finished products. For example, the industry faced an oversupply as demand for chemicals fell by up to 30 percent in the hardest-hit end markets, such as the automotive, transport, and some segments of the consumer products sectors. But the industry was already facing cyclical challenges such as cost and pricing pressures, overcapacity, and trade uncertainty before 2020. Chemical companies have responded by focusing on operational efficiency and, more importantly, cost management. In the first half of 2021, there appeared to be an easing in the major commodity markets and the respective cost pressure. The European Commission recently outlined an action plan to reduce Europe's dependency on 'third countries' (countries outside of the EU) in order to lower the volatility of critical raw materials and costs, as global chemical investments are still dominated by Asian countries. All in all, the chemical industry's output is expected to grow by 3% in 2021 and 2% in 2022. But the long-term economic outlook remains highly uncertain due to the ongoing COVID-19 pandemic and its continued economic impacts.



## Climate change, protection policies and sustainability

Today's climate challenges are being addressed by policies designed to reduce greenhouse gas emissions and increase circularity. The United States has rejoined the Paris climate agreement, committing to a meaningful reduction of emissions with the goal of net zero carbon emissions by mid-century. Europe is continuing to establish itself as a destination for investments into climate-neutral and circular technologies, for example with the recently announced 'fit for 55' package. Sustainability, however, is not a development exclusive to governing bodies or institutions.

Consumers themselves were pushed to adapt their behavior from one day to another in the face of lockdowns, restrictions, and economic instabilities. Consumer trends that had been developing on a clear path over the last years were disrupted as consumers turned to products and brands with a stronger focus on encouraging sustainability in the supply chain. It almost seems as if the global spread of the virus has forced consumers to rethink their relationship with nature from a perspective of greater awareness and responsibility. Initial observations show that consumers are paying closer attention to the ecological impact of consumption and the origins of raw materials, favoring brands that take on environmental issues and locally sourced items, even if they cost a little more.

- 85 percent of consumers adopted at least one lifestyle change to be more sustainable last year, with a third (32%) considered "highly engaged"; up 17 percentage points from before the pandemic
- Three-fifths (61%) of consumers reduced their single-use plastic usage, while two-fifths (39%) are buying fewer new goods than they were a year ago, driven by Gen-Z and younger Millennials

Source: Deloitte UK, 2021 (Deloitte's Sustainable Consumer Research Survey)





### Focus on innovation

The chemical industry, with its innovative patterns and productivity growth processes, is one of the largest and most research- and development-intensive sectors in every advanced economy. Recent trends have shown that the industry seems to have a proactive rather than reactive approach towards innovation and the aim to achieve zero carbon emissions. These developments include:

- Circularity, e.g. building up expertise and skills in the area of recycling, developing new processes, and creating new value chains to close the gaps
- Green energy, e.g. commitments towards offshore wind farms and clean hydrogen
- Alternative mobility drive trains, e.g. electric vehicles, and battery manufacturing



# Development of uncertainties

For the original study, we chose a combination of the most relevant uncertainties shaping the future world that would generate the most challenging, divergent, and relevant future scenarios and placed them in a matrix along the following two axes for better analysis:

- Value creation model of circular economy
- Competitiveness of European chemical assets

After two years, we wanted to reevaluate these uncertainties and review their development on the road towards 2040.



Fig. 2 – Scenario framework



**Regulated value creation**

Along the vertical axis, regulated value creation has been accelerated with developments such as the EU Green Deal, in which the commission proposes the transformation of EU economy and society to meet climate ambitions such as:

- Cleaner energy and cutting-edge clean technological innovation
- Longer lasting products that can be recycled and re-used
- Fresh air, clean water, healthy soil, and biodiversity

The recent announcement of the ‘fit for 55’ package further acknowledged the fundamental role of chemicals for human well-being and for the green and digital transition of European economy and society. At the same time, the package recognizes the urgent need to address the health and environmental challenges caused by the most harmful chemicals.

Several elements of the EU package affect the chemical industry in the hope of enabling the EU industry to reclaim its position as a globally competitive player in the production and use of safe and sustainable chemicals, supporting industrial innovation so that such chemicals become the norm on the EU market and a benchmark worldwide.

**Tab. 1 – EU Climate Goals**

Pricing	Targets	Rules
<ul style="list-style-type: none"> <li>• Stronger emissions trading system (ETS) including in aviation</li> </ul>	<ul style="list-style-type: none"> <li>• Updated effort sharing regulation</li> </ul>	<ul style="list-style-type: none"> <li>• Stricter CO<sub>2</sub> performance for cars and vans</li> </ul>
<ul style="list-style-type: none"> <li>• Emissions trading that includes maritime, road transport and buildings</li> </ul>	<ul style="list-style-type: none"> <li>• Updated land use change and forestry regulation</li> </ul>	<ul style="list-style-type: none"> <li>• New infrastructure for alternative fuels</li> </ul>
<ul style="list-style-type: none"> <li>• Updated energy taxation directive</li> </ul>	<ul style="list-style-type: none"> <li>• Updated renewable energy directive</li> </ul>	<ul style="list-style-type: none"> <li>• ReFuelEU: More sustainable aviation fuels</li> </ul>
<ul style="list-style-type: none"> <li>• New carbon border adjustment mechanism</li> </ul>	<ul style="list-style-type: none"> <li>• Updated energy efficiency directive</li> </ul>	<ul style="list-style-type: none"> <li>• FuelEU: Cleaner maritime fuels</li> </ul>

Source: European Commission.

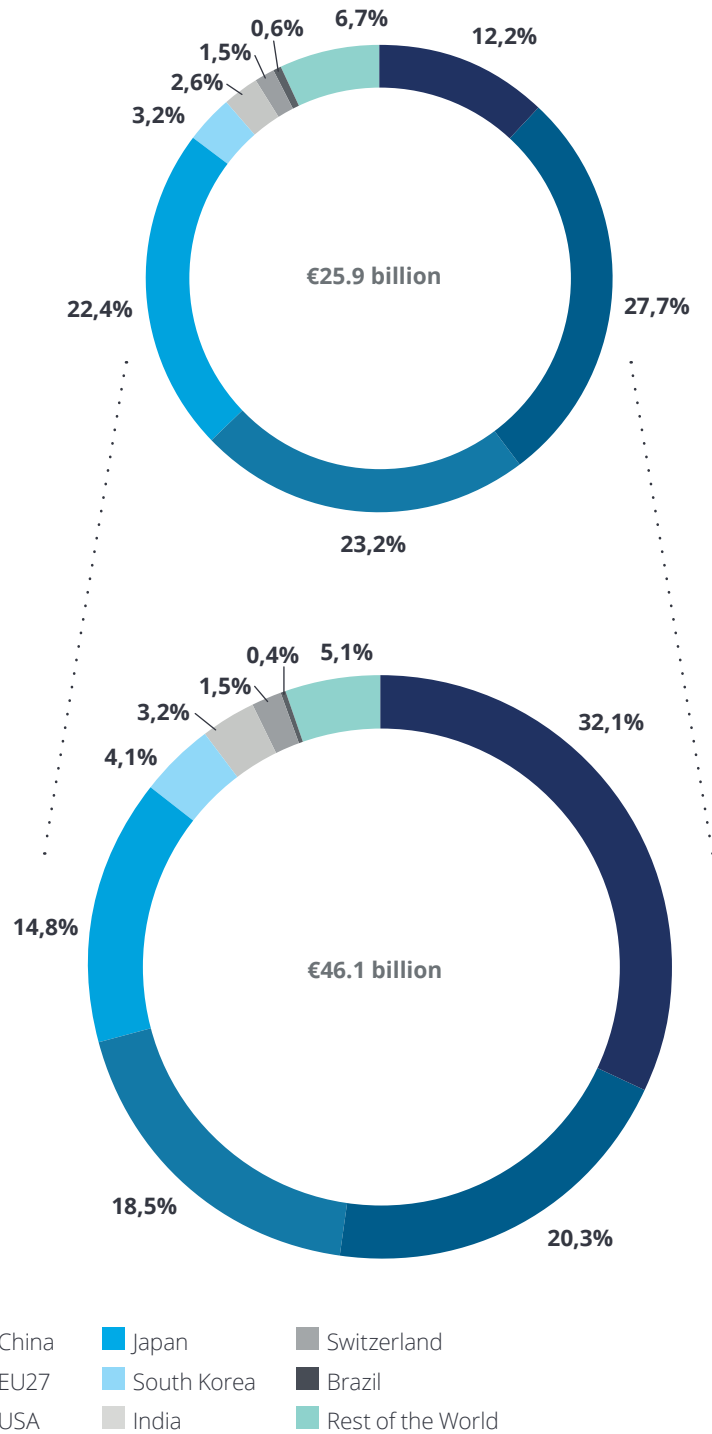
**Open value creation**

On the other hand, the chemical industry has also taken a proactive rather than a regulated approach to value creation and has confirmed its position in the driver’s seat of innovation. Although capital expenditure has declined in comparison to other global regions such as North America, Europe in previous years has made notable investments in research & innovation (R&I) at the highest level, as illustrated by the recent findings of the CEFIC study shown below, on topics such as:

- Chemical recycling of plastic waste
- Second-life batteries as flexible storage for renewable energies to increase green power across industries
- Developing low/zero carbon process technologies by 2030-2035 (examples: methane pyrolysis, electrical crackers and new processes for future low-carbon platforms like hydrogen, ammonia, methanol)
- Zero toxicology

**Fig. 3 – R&I spending by Country**

**2009 vs. 2019 R&I spending by country (€ billion)**



Source: Cefic Chemdata International 2021.



**Transformation**

The other axis, competitiveness of European chemical assets, has seen a clear trend towards transformation. Industry experts speak of a “new era” of forward integration where the industry pursues opportunities to develop new solutions from existing materials or molecules in order to meet new market demands while being supported by digital business models and ecosystems. In doing so, the chemical industry aims to capture value through systems-level formulations and solutions instead of focusing on new molecules and materials. The added value of providing solutions takes place further down the value chain, much closer to end customers and applications. The chemical industry needs new systematic approaches that

consider the entire ecosystem and develop solutions that accelerate the time-to-market. Additionally, digitalization has made its way from a process control and efficiency tool to a holistic concept of improving internal and external processes and activities, including data exchange platforms.

From the customer perspective, digitalization is paving the way for the chemical industry to generate value in two ways. First, by ensuring customer interactions are efficient, effective, and custom designed (inspiring, connecting, collaborating). And second, by enabling new, value-generating business models that are “fit for purpose”. Practices currently observed in the chemical industry revolve around establishing

platforms for value chain partners and engaging with them in a broad and comprehensive manner.

Another way in which the competitiveness in the European chemical industry is changing fundamentally is in terms of talent. Shifting paradigms are driving chemical companies to reimagine what the future of work and talent could look like in the chemical industry. We have identified three main issues:

- Changing end-market patterns
- Challenges attracting talent
- Changing workplace settings

**Tab. 2 – The future of work in Chemicals**

Pricing	Targets	Rules
<ul style="list-style-type: none"> <li>• Re-evaluate the work being done.</li> <li>• Revisit work outcomes and challenge processes.</li> <li>• Enable humans and technology to collaborate more effectively in order to unlock human potential at scale over time.</li> </ul>	<ul style="list-style-type: none"> <li>• Access needed capabilities across a broader talent ecosystem, curating personalized and elevated experiences for the entire workforce, and engaging them for impact.</li> <li>• Consider capabilities in and around the enterprise.</li> <li>• Create internal talent marketplaces and leverage intelligent machines, ecosystem partners, and suppliers.</li> </ul>	<ul style="list-style-type: none"> <li>• Move beyond workplaces as a physical location to recognizing the role of culture and leadership in creating an optimal workplace environment that maximizes the potential of all workers at all levels.</li> <li>• Create a supportive workplace environment that empowers workers with technology and tools and gives them the flexibility to choose where and how work gets done.</li> </ul>

Source: The future of work in chemicals and materials, Deloitte.

# Summary

Upon reflection, we have seen significant volatility within the global chemical industry. Over the course of the ongoing pandemic, growing consumer awareness towards sustainability and health as well as the further development of climate policies and innovation has driven the transformation and shaped the regulatory aspects of the European and global chemical industry.

We have seen that value creation in connection with the circular economy (and overall sustainability topics) has been developed and strengthened both through regulated and open value creation and that the endpoints of the axis complement each other when it comes to driving value creation.

On the other axis (competitiveness of chemical assets), however, we do see a clear development in the direction of transformation rather than a business-as-usual scenario.

The original scenarios in the study “What will the future of the chemicals value chain in Europe look like by 2040?” (Monitor Deloitte: Future of the chemicals value chain in Europe; What will the European chemicals value chain look like in 2040?) remain valid and realistic; however, we now expect the industry in Europe to further

develop in the direction of the scenarios on the right-hand side, namely, “leading into our sustainable future”, and “cracking under pressure”. With several value creation/innovation developments and regulatory changes expected in Europe (and globally) in the coming months and years, we will need to closely monitor the developments in the areas of sustainability and circularity in parallel to the recovery from the COVID-19 pandemic.



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