From disruption to reinvention

The future of supply chains in Europe

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Meet the Authors

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CEO – Europe

Jean-Marc Ollagnier is the chief executive officer of Accenture in Europe, with management oversight of all industries and services in Europe. He is also a member of Accenture's Global Management Committee.

Prior to being named to his current position in March 2020, Jean-Marc was group chief executive of Accenture's Resources group since 2011 serving the energy, utilities, chemicals, forestry products, metals and mining industries.

Between 2006 and 2011, Jean-Marc served as managing director for Accenture's Resources group in Europe, Africa, the Middle East and Latin America. Prior to this role he was country managing director of Accenture in France and the Benelux countries.

Kris Timmermans

Senior Managing Director,
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Kris Timmermans leads Accenture's Supply Chain & Operations function and is a member of the company's Global Management Committee, where he also represents the Chief Financial Officer/Enterprise Value and Customer and Channels functions.

Kris has set a clear mission for supply chain: help clients reimagine their supply networks to be more relevant, resilient, and socially and environmentally responsible. He guides a multidisciplinary team using the transformative power of data and technology to drive customer-centric business models.

With 27 years of experience in the sector, Kris is a pioneer in the evolution toward digitally powered "intelligent" supply chains. Since joining Accenture in 1994, he has led supply chain and enterprise-wide transformations for clients across multiple sectors, including consumer goods, automotive, chemicals, pharmaceuticals, industrial equipment and life sciences.

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Michael leads Growth & Strategy for Europe, overseeing all aspects of Accenture's strategy including shaping and implementing strategy and investments, including several significant acquisitions. He also serves on Accenture's Global Leadership Committee and Europe's Management Committee.

Michael has been with Accenture for more than 22 years and held many significant roles including Head of Health & Life Sciences, Strategy & Management Consulting lead, Regional P&L for Products Industries, and Global Growth & Strategy Lead for Accenture Digital.

Contents

Due to the pandemic, companies were already struggling with supply chain disruption

-€112.7 billion

-0.9 % of GDP

Economic losses due to supply chain disruptions in the Eurozone in 2021.[1]

Please refer to Methodology section.

The war in Ukraine has compounded these challenges

Several factors are exacerbating the shock to supply:

- energy prices and inflation
- raw material shortages and logistics breakdowns
- talent shortages

Depending on the length and severity of the war, the cost of supply chain disruption in the Eurozone across 2022-2023 could amount to:

€242 billion (2% of GDP) in an ongoing war scenario, or

€920 billion (7.7% of GDP) in a protracted war scenario.[2]

Please refer to methodology section.

Disruption:

supply chain shocks and the accumulation of disruption

Supply chain shocks

Logistics breakdowns

- Transportation bottlenecks worsened input shortages and sent costs skyrocketing.
- Continued lockdowns in Chinese ports and war in Ukraine further strain the issue.
- 90% of Ukraine's wheat exports have halted due to port closures. Ukraine accounts for nearly 10% of global wheat exports. Wheat prices hit record highs, rising 30% in 2022Q1 on the previous quarter.[3]

Lack of material supplies

- Resurging demand and initial precautionary hoarding led to inflation and overwhelmed supply chains.
- The concentration of suppliers for critical minerals and food is compounding challenges.
- For example, Russia is one of the largest suppliers of palladium, platinum and diamonds,[4] while Ukraine is a critical supplier for neon gas, agricultural products, and metal ores.[5]

Energy security

- Energy markets were already undersupplied before the war given the economic recovery.
- The war in Ukraine has caused further oil and gas price spikes: the price of brent crude oil could peak at $115 USD per barrel in 2022.[6]
- Suppliers are shutting down some operations because energy costs are too high, which creates another wave of input supply shocks.

A tight talent market

- Labor and skill shortages plagued most industries.
- The war has created further tension in targeted skills areas like transportation.
- 14.5% of the global seafarer workforce are from Russia and Ukraine.[7]

Logistics breakdowns

Ports, vessels and containers are critical to trade. Around 90% of traded goods are transported by ocean shipping.[8]

The pandemic disrupted logistics networks, and the war is compounding everything. The result?

- more pricing and availability issues in ocean freight
- greater port congestion
- longer air traffic routes and transit times
- delays in road and rail transportation

Rising rates and severe port congestion

With Russia-bound containers stranded in Europe and lockdowns in the Chinese port of Shanghai, global port congestion was still close to peak levels in April 2022, causing delays and low arrival reliability.[9]

Container shortages and severe port congestion have driven shipping rates rising to nearly 10 times their level compared to June 2020.[10]

Liners have ordered over 500 new container vessels, but they won't come online until 2023 or 2024.[11]

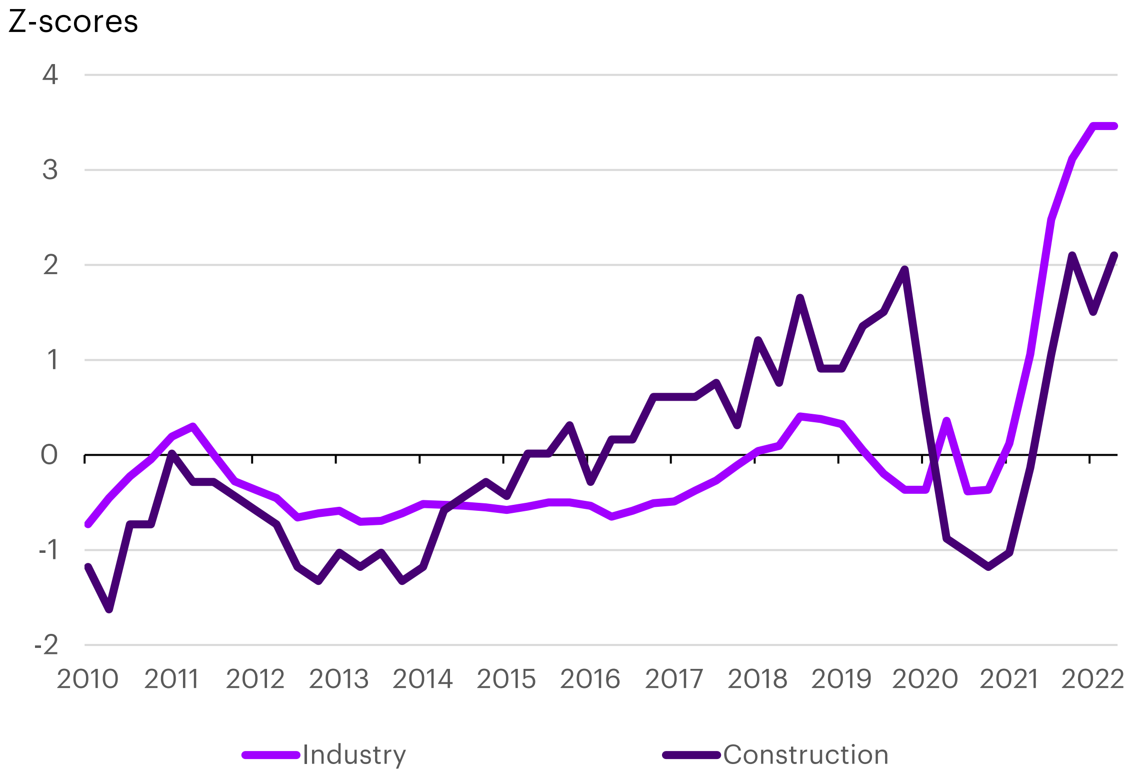
Lack of material supplies

Companies are increasingly concerned about the lack of intermediate inputs and critical components.

Supply of these is concentrated: **over half (52%) of the share of EU import value of the most foreign-dependent products originates from China.[12]**

- Naturally, supply shortages have billowing effects across industries like automotive.
- In Germany, car production in the first four months of 2022 was down 32% compared to 2019 as a result of a lack of primary product inputs.[13]

Material shortages are a rising concern



Source: Oxford Economics/Haver Analytics
Notes: A z-score is a numerical measurement that describes a value's relationship to the mean of a group of values. We compute z-scores to indicate the extent to which reported shortages have risen by historical standards.

A tight talent market

The most complex and enduring supply chain disruptor is the talent challenge.

- The skills the world needs are changing, along with demographics and employee expectations. The combined effect of these monumental shifts is here to stay.
- To contend with tight labor markets, employers will need to continue to consider raising wages and improving working conditions as they attempt to attract and retain workers.

The changing world of work

-7.2m
workers in Germany projected by 2035.[14]

1 in 4
UK workers are planning a job change.[15]

425,000
heavy goods vehicle driver shortfall in Europe.[16]

62%
of supply chain leaders say their employees are not advancing enough in the new skills their companies need.[17]

Energy security

Energy security is difficult to protect, as both world and European economies are still heavily reliant on oil and gas.

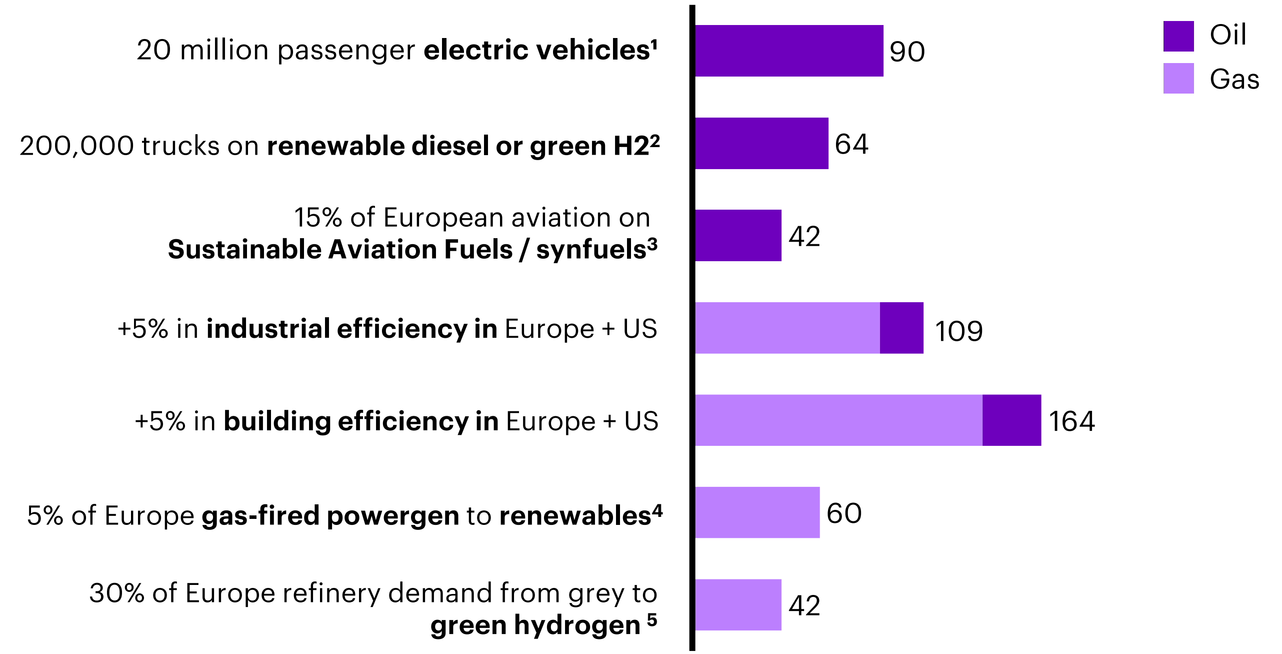
Together, oil and gas make up nearly 50% of the total energy supply in 2022.[18]

How can we reduce dependency? Increase industrial and building efficiency and switch to green electricity and low-carbon transport fuels. A few comparisons:

- A combination of 20 million Electric Vehicles (EVs) and 200,000 heavy-duty trucks using renewable diesel can replace the equivalent of more than 150 million barrels of oil demand.[19]
- Switching 15% of European aviation to sustainable aviation fuels (SAF) can reduce oil demand similar to the impact of ca. 10 million EVs in road transport.[20]

Potential actions to reduce dependency on petroleum-based energy

Oil and gas demand avoided (Million barrels of oil equivalent (Mmboe)/yr)



Notes:

1 Assumed a car using 720 liter of gasoline a year with 6 l/100km and 12,000 km/yr.
2 Assuming a 40-ton truck using 33.1 L/100km for 150.000 km/year.
3 Based on European 2021 aviation fuel demand
4 Assumed gas-fired baseload power plants replaced by flexible wind/solar/battery storage mix able to provide stable supply similar to baseload power generation.
5 Assuming 0.03 boe natural gas needed to produce 1 kg SMR-based H2 today
Source: Accenture Research Analysis based on Eurostat and IEA

Risk:

value at stake and
projected recovery

The war impact

Primary market forces such as economic growth, inflation and consumer sentiment, already impacted by the effects of the pandemic, will be further influenced by the evolution of the war. As a result, we have considered a number of possible scenarios that may unfold, with varying levels of economic impact. Unfortunately, the controlled impact scenario has elapsed. The ongoing impact is the current baseline.

Three potential scenarios

1. Controlled impact

- Sanctions do not escalate and may even scale back as part of a negotiated truce, alleviating supply disruptions.
- Commodity prices return to prewar levels.
- Consumer and business confidence increases; companies and people return to prewar investment plans and spending.

2. Ongoing impact

- Supply disruption of key commodities continues through 2022. Some countries continue to face oil and gas embargoes.
- Commodity supply shocks cause short-term price increases.
- Consumers cut back on some nonessentials and businesses focus on improving operating efficiency.

3. Protracted impact

- A wide Russian oil and gas embargo leads to significant structural supply disruption.
- Commodity prices remain high and volatile into 2023.
- Sustained price increases reduce consumer spending power, contributing to a notable decline in consumer and business confidence and a slowdown in growth.

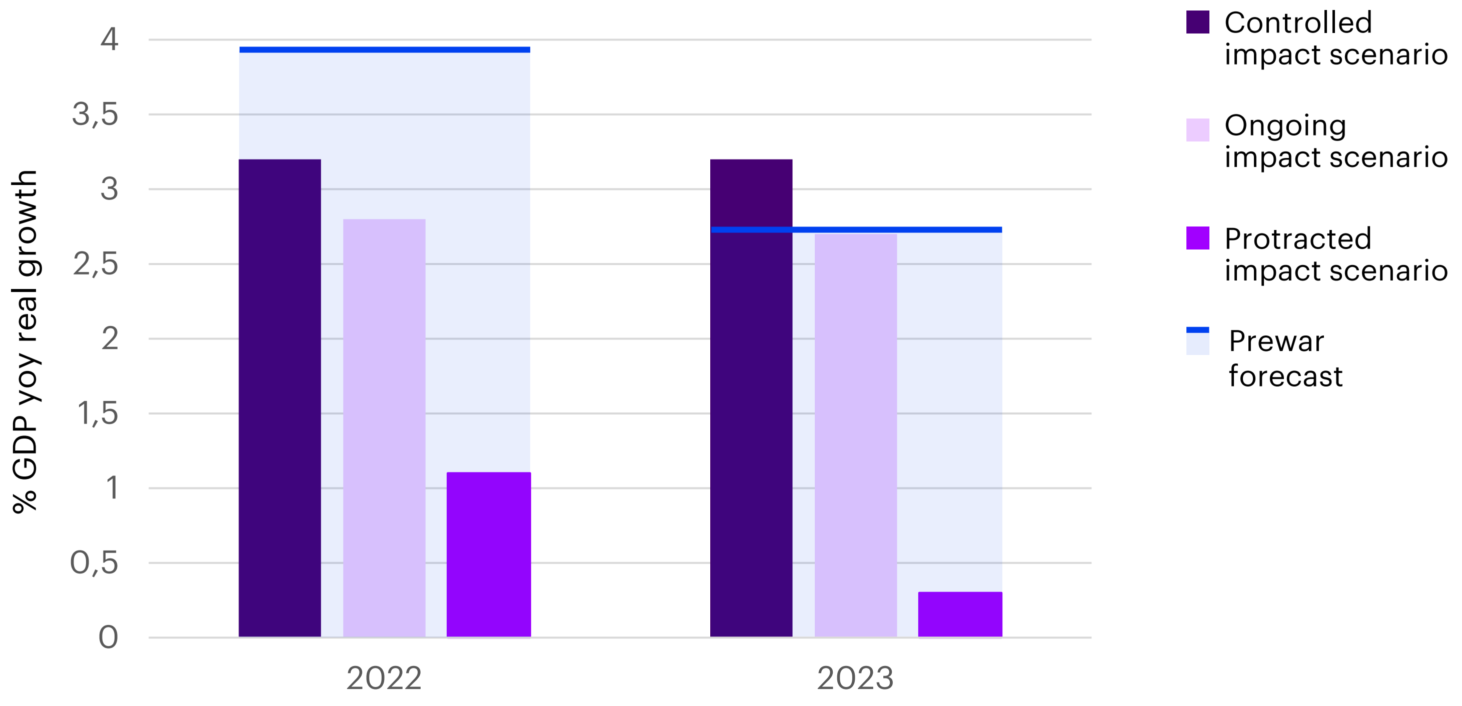
Market force: economic growth

The current view among economic forecasters is that the war will lead to a material deceleration in growth.[21]

Under the 'ongoing' scenario, Oxford Economics forecasts that the Eurozone will avoid recession, but Eurozone gross domestic product (GDP) will be 1.1 percentage point lower in 2022, relative to prewar forecasts made in January of 3.9%.[22]

The Eurozone's trade relationships make it vulnerable to a slowdown

Forecasted GDP growth in the Eurozone by scenario (Percentage yoy change)



Source: Based on the mapping of Oxford Economics World Economic Prospects estimates to three scenarios of controlled impact (upside as of April 25th 2022) , ongoing (baseline data as of April 25th 2022) and protracted (downside, April 25th 2022)

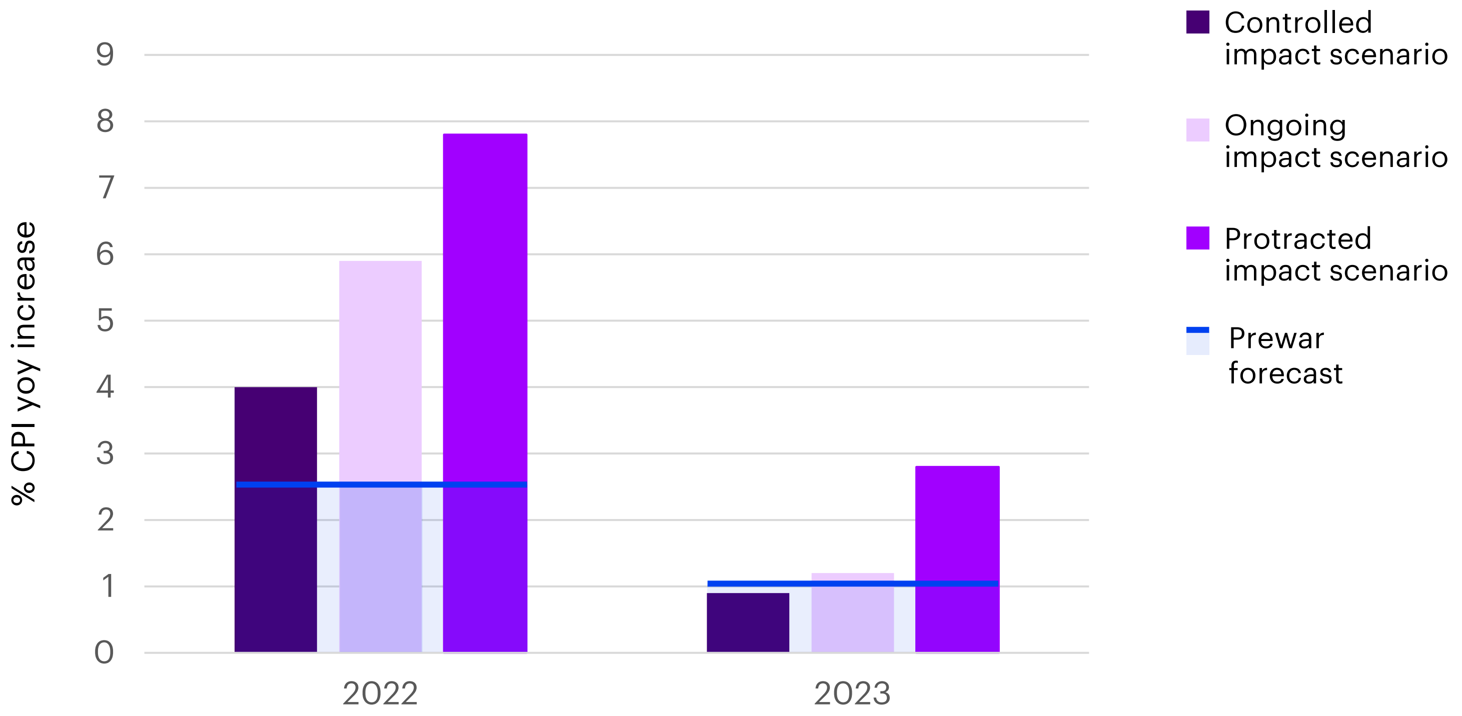
Market force: inflation

Inflationary pressure may lead to potential upward pressure on wage inflation in some countries and industries.

Under the ongoing scenario, Oxford Economics forecasts that inflation will rise by 5.9 percentage points in 2022 and by 1.2 percentage points in 2023.[23]

Inflation is forecasted to rise in the Eurozone

Forecasted Eurozone inflation by scenario (Percentage yoy change)



Source: Based on the mapping of Oxford Economics World Economic Prospects estimates to three scenarios of controlled impact (upside as of April 25th 2022) , ongoing (baseline data as of April 25th 2022) and protracted (downside, April 25th 2022)

Inflation impacts differ by industry

Industries bearing the most exposure to inflation are those in which material inputs, energy and labor represent a large part of the overall cost structure.

Take the chemicals industry, where material costs tie mainly to the cost of petroleum. Similarly, the high-tech and industrial sectors (excluding logistics/freight) rely on energy-intensive material inputs.[24]

The critical question: Is it possible to pass increased costs onto customers?

Cost structure of selected industries in Europe (% share of inputs)

Materials Inputs

14% Industry Average*

Automotive
78%

Aerospace & Defence:
75%

Consumer Goods & Services:
72%

Materials inputs = percent share of materials inputs (of total intermediate inputs). Materials inputs include all raw materials and processed goods.

Energy Inputs

8% Industry Average*

Utilities:**
51%

Mobility/Freight:
11%

Chemicals:
10%

Energy inputs = percent share of energy inputs (of total intermediate inputs). These include coal and lignite, crude petroleum and natural gas, coke and refined petroleum products as well as electricity, gas, steam and air conditioning.

Labor Inputs

59% Industry Average*

Public Services:
77%

Health:
75%

Software & Platforms:
67%

Labor inputs = percent share of wage within value added.

* Weighted average of 19 industries (Aerospace & Defense, Automotive/Mobility, Banking, Capital Markets, Chemicals, Communications & Media, Consumer Goods & Services, Energy, Health, High Tech, Industrial, Insurance, Life Sciences, Natural Resources, Public Sector, Retail, Software & Platforms, Travel, Utilities).
** Utilities include electricity, gas and steam (and exclude water and waste management)
Source: Accenture Research analysis of OECD Input Output tables.

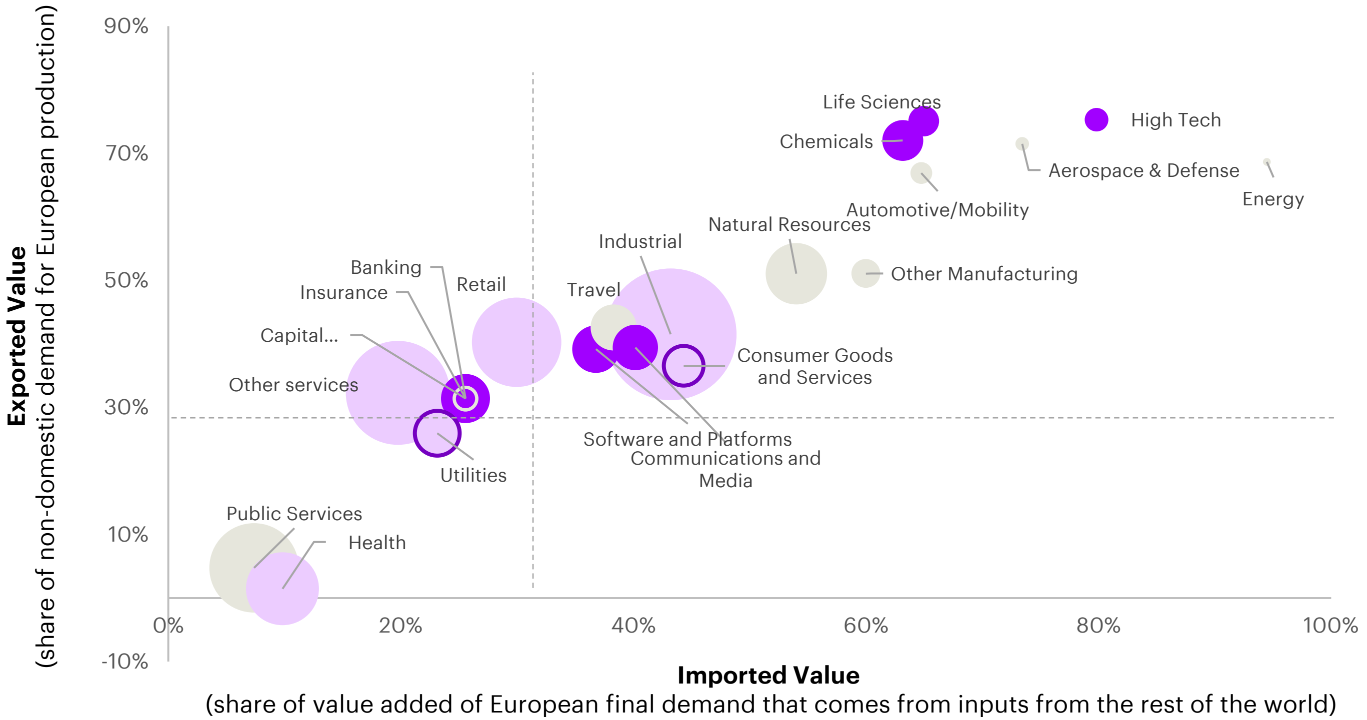
The supply chain is the nerve center of the European economy

Up to **30%** of total European value added relies on functioning cross border supply chains, either as a source of input or as a destination for production.[25]

We see particular exposure to supply chain shocks in manufacturing sectors, and even more in industries like high tech (e.g., 80% of final value added comes from inputs sourced across borders, while 75% of demand for final products comes from non-domestic markets), automotive and aerospace.[26]

Industry exposure to supply chain disruption varies

Value added by European industry related to supply and demand networks
(Share of value added final demand)



Real GDP growth
High – above 1,2% ** | Moderate – between 0,6% and 1,2% | Low – below 0,6%

Note:
Size of the bubble indicates weight on GDP in 2022, color indicates expected GDP CAGR for the '19-24 period under Oxford Economics baseline scenario
**1,2% is CAGR expected for total economy. High indicates the industry is growing faster than the overall economy
Source: Accenture Research Analysis of OECD TiVA and Oxford Economics Industry Databank.

The value at stake

A protracted scenario could cost up to €920 billion in lost GDP for Eurozone economies as a result of supply shocks.[27]

	Ongoing Scenario	Protracted Scenario
Lost GDP in real figures In 2022-2023	**-€242 billion**	**-€920 billion**
Lost GDP % in 2023	- 2.0%	-7.7%

Source: Oxford Economics Global Economic Model results for scenarios designed by Accenture Research

Recovery time by scenario:

supply chain disruptions could take up to 24 months to ease in a protracted scenario, versus approximately 12 months in the ongoing impact scenario.[28]

Disruption

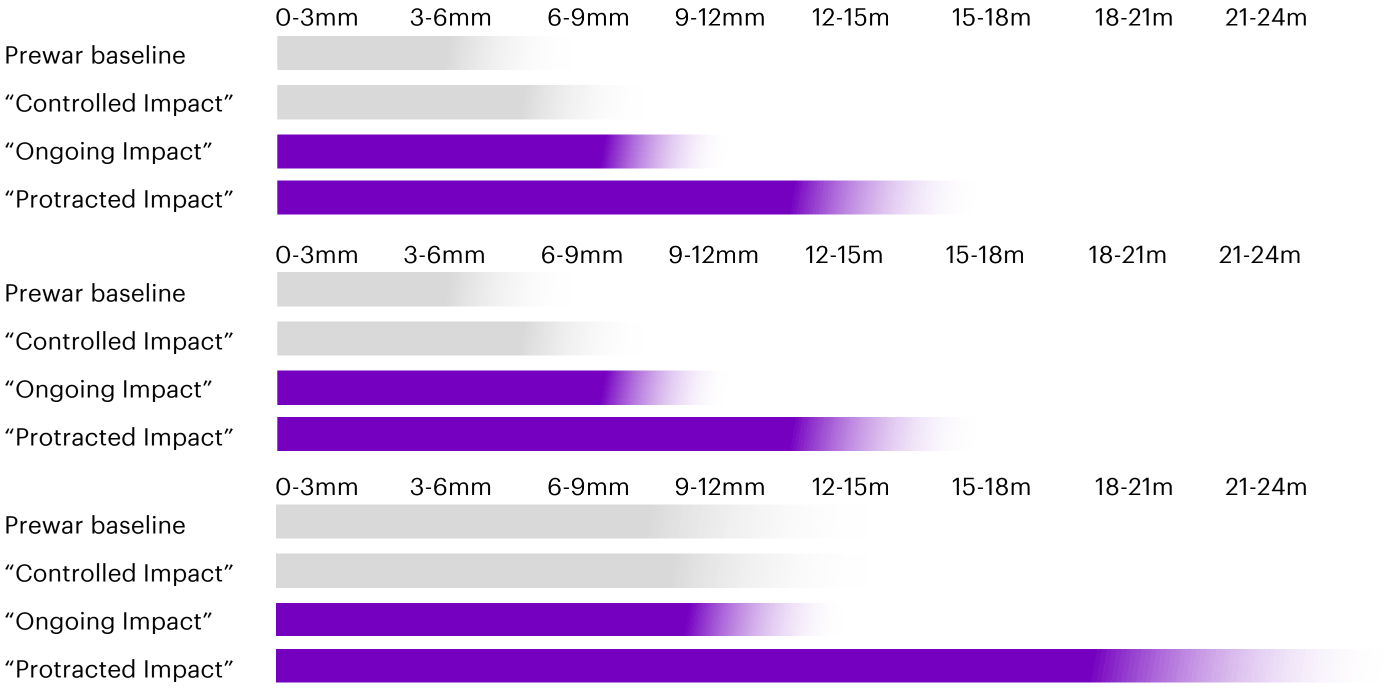
Logistics disruption

Materials shortages

Energy prices

Labour and skill shortages

Recovery time



- Labor and skills shortages will remain a long-term, structural issue for European economies across all scenarios.
- That said, these labor shortages will be rather less acute over the next 18 months in the "protracted impact" scenario, given the weaker outlook for economic activity.

Source: Oxford Economics Global Economic Model results for scenarios designed by Accenture Research

Reinvention:

how to reinvent supply chains for a new era of perpetual uncertainty

The Reinvention of Supply Chains

Europe is at the dawn of a new era: a new energy system, new economic cycles and a new geopolitical order. The decade ahead heralds a fundamental rethinking of supply chains for competitiveness.

A Paradigm Shift

From:
Optimizing for Cost

- Energy, material, transportation as a commodity – availability is more important than source.
- Global networks that prioritize efficiency.
- Sustainability is an afterthought. Products and processes designed with a linear mindset - responsibility ends when the product is purchased.

To:
Optimizing for Value and Resilience

- Reimagined networks that focus on security of supply and services, tier-1 and beyond, prioritizing sourcing diversification.
- Supply chains prioritize increasing relevancy to customers, with a holistic definition of value, markets/customers proximity.
- Sustainability as a 'must have' embedded by design – supply chains become circular.

Powered by Digital Technologies
Real Time data, Cloud and Intelligent Operations

Redesigning for the new era

To contend with an uncertain future and build long-term value, European businesses need to redesign their supply chains around three key ideas: resilience, relevance and sustainability.

01
Resilience

02
Relevance

03
Sustainability

Resilience

Modern supply chains must minimize day-to-day risk but also absorb, adapt to, and recover from catastrophe whenever and wherever it strikes. Organizations can proactively manage risk and boost resilience by building intelligent and resilient supply chains that are risk-aware, secure, transparent, adaptive, fast-moving and optimized.

86% of European C-level executives are planning fundamental changes to their operations as a result of the crises.[29]

Resilience is enhanced by a combination of visibility, agile processes and robust networks which also offer additional benefits in the mid- and long-term, such as achieving sustainability goals and complying with supply chain regulations.

How to get there:

- **Address operational risk**
  Respond to sudden supply chain changes with improved dynamic visibility, risk identification and mitigation solutions.
- **Address tactical risk**
  Adapt to evolving supply and demand with scenario planning and risk/opportunity analysis as part of sales and operations planning.
- **Address strategic risk**
  Manage uncertainty by boosting flexibility and capacity through network modeling and simulation, stress tests, strategic buffer sizing and multi-sourcing options.

Benefits

- Early detection of logistics challenges, demand spikes and material shortages.
- Dynamic visibility of the supply chain to respond to disruptions as they happen as well as help achieve sustainability targets and regulatory compliance.
- Potential to offset investment costs, as the same technologies you use to build your intelligent supply chain can provide mid- and long-term benefits to sustainability and compliance.

Relevance

Customer needs are accelerating and changing – especially in terms of value, choice, and convenience.
Relevance requires that companies are there for their customers' "moments that matter" by prioritizing the customer experience.

71% of executives say that technology is giving them the opportunity to reimagine the fundamentals of their business.[30]

The relevant supply chain is intelligent and agile, able to anticipate and adapt to shifting business conditions and remain applicable to customer expectations, stakeholder demands and ecosystem potential with data, analytics and automation at its core.

How to get there:

Learn from the future

- Capture new data sets that come directly from customer interaction, including real-time data, from inside and outside your organization and across the value chain.
- Process data using automation and artificial intelligence (AI) to identify new data patterns rapidly and inform decision making.

Reinvent the organization

- Move to a flatter, faster organizational structure where the corporate center and C-suite focus on making cross-cutting decisions together.
- Jointly define organizational purpose, set strategy and allocate capital for key initiatives.
- Work backwards from the customer – embed capabilities into business processes that directly benefit the customer experience.

Embed intelligence in the enterprise

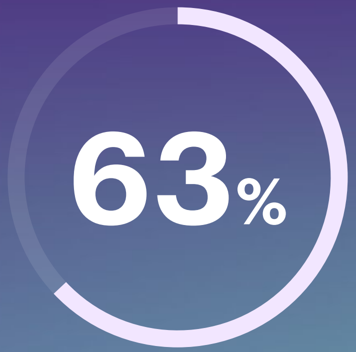
- Transition to intelligent processes, products and platforms.
- Apply a cloud-first approach as the key tenet of your supply chain transformation.
- Use tools like zero-based cost management to overcome the ongoing effects of inflation.

Benefits

- Mitigates supply chain challenges for materials, logistics and labor.
- Allows you to manage service levels and costs while providing an infrastructure and governance model to unleash innovation and growth.

Sustainability

Every business must now be a sustainable business. Companies must pursue improved environmental, social, and governance performance by transforming their operations to be circular, net zero and trusted.



of European executives state that becoming a truly responsible/ sustainable business is a top priority over the next three years.[31]

The sustainable supply chain factors in current and future needs of all stakeholder groups including business leaders, employees, customers, investors, ecosystem partners and society at large.

How to get there:

Reach net zero and beyond

- Find ways to get your value chain to zero environmental and social impact. From there, look for ways to become net positive. A deep understanding of the impact of your internal operations and those of partners and suppliers is vital.

Engage in circular business models

- Shift from linear processes to closed-loop, circular processes that minimize waste. Recycling, reuse, and repurposing must replace a "use once" mindset.

Find creative ways to nurture talent

- Redesigning for sustainability calls for a rethink of workforce skills. Moving toward more empowered, multidisciplinary teams means people may need to take on more complex roles.

Build trust through transparency

- Use multiparty systems like blockchain to add transparency to your value chain and improve trust among stakeholders.

Benefits

- Helps ensure a habitable world and the availability of resources for future generations.
- Reduces global socioeconomic inequities and unlocks the power of all employees.

The decade to deliver: Finding ways to grow amid uncertainty is the new perennial leadership challenge

For leaders and their organizations, there is no return to the relative comfort and safety of the not-so-distant past. The war in Ukraine, on top of the effects of the pandemic, has made clear that many of the comfortable certainties on which business leaders have long relied are no longer there.

Success may ultimately depend on how well leaders adapt to the demands of this new, testing environment. More than ever, their resolve will be critical.

Methodology

Cost of supply chain disruptions:

We estimated the impact of supply disruptions for 2021 in two stages, focusing on energy and non-energy bottlenecks separately:

Step 1:
the impact of non-energy bottlenecks (logistical disruptions, and shortages of labor and materials) was estimated:

- We ran a counterfactual scenario on the Oxford Global Economic Model, where developments in demand were allowed to feed through to sectoral output under 'normal' conditions. We then compared the counterfactual with the outturn in 2021 to estimate losses from these non-energy supply bottlenecks.
- Results were sense-checked against country-level survey evidence on supply disruptions.

Step 2:
we estimated the impact of higher energy bills:
We ran another counterfactual scenario on the Oxford Global Economic Model to estimate how the economy would have developed if energy prices had remained at more 'normal' levels.

Step 3:
We then compared the counterfactual with the outturn in 2021 to estimate losses from these energy-related disruptions.

The estimated impacts resulting from energy and non-energy disruptions were combined to produce total cost estimates (based on output losses and measured in nominal Euro terms) for the Eurozone. These were then aggregated to estimate the total impact.
Industries of focus include manufacturing, construction, retail and wholesale trade and transportation and storage.

Scenario analysis

Step 1:
The Oxford Global Economic Model was used to project forward the path of the Eurozone economy under three alternative scenarios relating to the Ukraine conflict:

- Controlled impact scenario where sanctions do not escalate and may even be scaled back as part of a negotiated truce, alleviating supply disruptions. Commodity prices return to prewar levels and so does consumer and business confidence.
- Ongoing baseline scenario: The conflict in Ukraine proves to be relatively short lived, with a negotiated settlement achieved by the end of 2022. The major economic spillovers from the war on the rest of the world are via higher prices for commodities such as oil, gas, and wheat and wider financial market disruptions.
- 'Protracted impact' scenario: In this scenario, we assume that the fighting in Ukraine lasts into 2023 and the West imposes further sanctions on Russia. Gas prices spike higher, while uncertainty in financial markets and among consumers also increases, exacerbating the negative impact of high inflation.
- Prewar figures refer to forecasted figures as of January 2022

Step 2:
Potential losses of the ongoing baseline scenario and those of a more protracted scenario are measured as the differential relative to prewar forecast, adding both 2022 and 2023 losses in real Euros.
Recovery times are based on Oxford Economics baseline assumptions and draw on a range of Oxford Economics forecasts, market data, and other indicators of future supply capacity.

Industry dependance on cross-border inputs and demand

Step 1:
As demand impacts, we estimate the share of non-domestic demand for a country's total production. Using data from the OECD TiVA tables, for each industry in each country we estimated the following shares:

Value added by source Country to Final demand World - Value added by source Country to Final demand Domestic / Value added by source Country to Final demand World

Step 2:
As supply we compute the share of value added of a country's final demand that comes from inputs of rest of the world. Using data from the OECD TiVA tables, for each industry in each country we estimated the following shares:

Value added by source World to Final demand Country - Value added by source Domestic to Final demand of the country / Value added by source World to Final demand Country.

Analysis covers all 19 Eurozone countries.

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