



# EU endeavors to secure and strengthen its supply chain

By Michael Taylor

## Overview

Extended supply chains were central to the global economy prior to the COVID-19 pandemic. Trade in goods became trade in tasks as a result. Companies fragmented their production processes, and increasingly their service activities, into a host of intermediate tasks, undertaken in many different places seeking to exploit the specific comparative advantage of each location. Prior to the pandemic, these intermediate linkages accounted for 70% of all global trade flows.<sup>1</sup>

The term “supply chain” suggests linear pipelines, whereas in actuality most supply chains are best described as entangled webs of companies involved in producing and delivering goods and services. For instance, components for Apple’s iPod were produced in Japan, Korea, and the United States, assembled in China, and then exported to the United States. The company had suppliers in 43 countries, and its 200 top suppliers spanned the globe.

Complex supply chains exist in most other industries. On average, an auto manufacturer has around 250 tier-one suppliers (i.e., direct suppliers of the final product), but across the full value chain, the number increases to 18,000. Aerospace manufacturers average 200 tier-one suppliers and 12,000 across the full value chain. In the technology sector, companies average 125 tier-one suppliers, and more than 7000 across the whole value chain.<sup>2</sup>

In reality, supply chains are far more regional in character than the term “global” suggests: they are mostly clustered around Europe, North America, and Asia, and largely exist around linkages within and among these regions. When it comes to complex production networks, the United States and

Germany are the most important global hubs, while China is a key global hub in simpler production networks, although it is moving toward more complex production. The EU is deeply involved in these supply chains, more so than most other countries/regions, and significantly more than both the United States and China.

## US–EU Trade and Technology Council (TTC)

At the June 2021 US–EU Summit held in Brussels, the US–EU TTC was created to coordinate approaches to key global trade, economic, and technology issues and to deepen transatlantic trade and economic relations, basing policies on shared democratic values.

The TTC has formed 10 working groups, co-led by relevant departments, agencies, and services of the US Government and the European Commission. These working groups will focus on technology standards, climate and green tech, secure supply chains, information and communications technology and services (ICTS), security and competitiveness, data governance and technology platform regulation, misuse of technology threatening security and human rights, export controls, investment screening, promoting small- and medium-sized enterprise (SME) access to, and the use of digital technologies, and global trade challenges.<sup>3</sup>

Working Group 3 on Secure Supply Chains is tasked to focus on advancing supply chain resilience and security of supply in key sectors for the green and digital transitions and for securing the protection of citizens. A priority track has been established for semiconductors, with an initial focus on short-term supply chain issues. Other top areas of

focus are clean energy, pharmaceuticals, and critical materials. In each of these sectors, the working group is tasked to increase transparency of supply and demand, map respective existing sectoral capabilities, exchange information on policy measures and R&D priorities, and cooperate on strategies to promote supply chain resilience and diversification.<sup>3</sup>

## Semiconductors

The EU and the United States have identified semiconductor supply chains as their top priority for work in the TTC Working Group on Supply Chains. In recent years, semiconductor supply chains have been subjected to a series of disruptions that have unsettled the global economy.

US companies lead globally in the production of semiconductor manufacturing equipment and in semiconductor design and associated tools. European companies also show strength in design and manufacturing equipment production, and in some materials and subsegments key to the semiconductor manufacturing process. Each party, however, relies heavily on others for highest-end chip manufacture; critical materials; and assembly, packaging and testing. The TTC could provide a mechanism through which the two parties could exploit their respective strengths and reduce their respective dependencies within semiconductor supply chains.

## Critical materials

The EU and the United States have each issued reports identifying strategic dependencies on up to 35 critical materials. Those dependencies will increase as EU and US companies deploy clean technologies that are particularly reliant



on critical materials. The International Energy Agency (IEA) estimates that mineral requirements for clean energy technologies will grow fourfold by 2040 and sixfold by 2050. EU demand is projected to increase tenfold. The largest reserves of these critical materials are found in countries with fragile governments and poor protections for human rights, rule of law, and the environment.

The issue is particularly sensitive because the EU and the United States are each excessively dependent on China for many critical materials. When it comes to rare earths, for example, China accounts for 98% of EU imports and 80% of US imports.<sup>4</sup> In addition, China's massive state subsidies for Chinese firms have priced European and US companies out of the market in these areas, and it has sometimes used its exports as a trade weapon.<sup>5</sup> Through its Belt and Road Initiative (BRI), China is locking in lower standards for carbon content in products among a wide swath of countries across Eurasia and Africa, while the EU and the United States struggle to scale up higher-standard infrastructure initiatives.

In 2019, a Tsinghua University and partners' study indicated that BRI countries are currently on track to generate emissions well above 2DS levels (i.e., 2-Degree Scenario referring to limiting global warming to 2 degrees Celsius by 2100 from pre-industrial levels) based on current infrastructure investment patterns and growth projections. BRI-involved countries could exceed their 2DS carbon budget by as much as 11 GT by 2030 and 85 GT by 2050. In this scenario, these countries would account for 50% of global emissions by 2050, up from 15% in 2015, if all other countries succeeded in following a 2DS pathway.<sup>6</sup>

The EU and the United States have each prioritized efforts at building greater domestic mining and manufacturing capacity. Each has outlined similar approaches to reduce the risk of economic coercion, build greater supply chain resilience, boost domestic supply and R&D, and cooperate with like-minded partners internationally.

## Clean tech

According to the IEA, by 2030 the global clean tech market will surpass the value of the oil market, rising from USD\$122 billion to USD\$870 billion.<sup>7</sup> The competition to develop, commercialize, and deploy clean technologies is extremely intense, as companies seek advantage and as the EU and the United States each look to enhance the competitiveness of their companies in future technologies. At the same time, there is great potential for EU-US cooperation, not least because of the deep integration of the USD\$6.3 trillion transatlantic economy. European and US companies are deeply entrenched in each other's energy and clean tech markets—through trade, foreign investment, cross-border financing, and collaboration in R&D.<sup>8</sup> In addition, the European and US clean energy industries are extraordinarily dependent on critical raw materials from fragile countries with poor protections for human rights, rule of law, and the environment, and on China (and other countries in the region) in particular.

To address these shared concerns and to capitalize on this transatlantic potential, the EU and the United States identified clean tech as a priority area as well in the TTC Working Group on Supply Chains, and created a separate TTC Working Group on Climate and Clean Tech. EU and US officials pledged to “work toward” a Transatlantic Green Technology Alliance.<sup>9</sup> Ongoing and upcoming issues include challenges posed by carbon border adjustment mechanisms; bilateral negotiations on a Green Steel Deal, and potentially additional sectoral arrangements; and trade and climate issues at the World Trade Organization (WTO).

## EU and US dependencies

### External dependencies in sensitive sectors

In Spring 2021, the European Commission and the United States published assessments of their respective supply chains, identifying dependencies and

policies that could diminish potential vulnerabilities.<sup>10</sup> Each identified semiconductors, pharmaceuticals, batteries, and critical materials as strategic sectors with vulnerable supply chains due to highly concentrated reliance on a small number of suppliers. The EU report identified serious import dependencies on China (52%), Vietnam (11%), and Brazil (5%); the US report highlighted heavy reliance on China, in terms of both supply and demand. **Charts 1 and 2** offer an overview of EU and US dependencies in sensitive ecosystems.

The European Commission singled out 137 products in sensitive ecosystems for which the EU is highly dependent. Almost three-quarters (99 products) are in energy-intensive industries, particularly raw or processed materials and chemicals. About one-quarter of the total (34 products) were also highly vulnerable, given their low potential for diversification and substitution with domestic production. Twenty-two of these highly vulnerable products are raw materials and intermediate goods, such as some ferroalloys and active pharmaceutical ingredients (APIs) such as antibiotics, vitamins, hormones, and heterocyclic compounds, which are particularly important in the manufacturing of medicines. The remaining 12 are finished goods (e.g., turbo-propellers, parts of protective garments, types of radiobroadcast receivers, and some types of medicines). The EU is also highly dependent on foreign sources for semiconductors, microelectronics, and cloud technologies, all of which are critically important to the EU's green and digital transformations.

In May 2021, in the updated New Industrial Strategy, the European Commission estimated that in sensitive ecosystems the EU is less dependent on the United States than vice versa but both have important common dependencies with China. In particular, these dependencies were around APIs, critical raw materials, and products needed for the green and digital transitions. The updated European Industrial Strategy suggested that where common


**Chart 1. EU and U.S. Dependencies in Sensitive Ecosystems**

Ecosystem		Dependencies	
		US	EU
Ecosystems Included in Both Reviews	APIs	China, India, EU	China, India
	Critical raw materials	China, South Africa, Russia, Australia, Canada	China, South Africa, Brazil, Turkey, etc.
	Lithium-ion batteries	China, Japan, South Korea	China, Japan, South Korea
	Semiconductors	Taiwan, South Korea, China	Taiwan, South Korea, US, China
Ecosystems Included in EU Review Only	Cloud and edge computing		US, China
	Hydrogen		Africa, Asia

European Commission; and United States Government.

**Chart 2. EU and U.S. Mutual Dependencies in Sensitive Ecosystems**

	Number of Dependent Products	Potential for Diversification				Share in Total Import Value
		Low	Medium	Medium-High	High	
U.S. Dependencies on the EU	260 products	18%	34%	28%	20%	3.1%
EU Dependencies on the U.S.	15 products	0%	7%	13%	80%	0.1%

European Commission.

**Chart 3. EU and U.S. Mutual Dependencies in Sensitive Ecosystems: Examples by Sector**

	Health	Critical Materials	Renewables	Digital/ICT
U.S. Dependencies on the EU	APIs, medical equipment	Types of steel, phosphates	Wind-powered electric generators	Lithography
EU Dependencies on the U.S.	APIs	Lithium oxide, beryllium	Types of electric motors and generators	Optical devices, semiconductor design tools

European Commission.

dependencies do exist, the EU may choose to pool resources and build stronger and more diverse alternative supply chains with its closest allies and partners.

Of course, internal dependencies also exist within the EU, as various countries and companies rely on a limited number of supply sources within the European Single Market. This underlines the importance of a Single Market that is open to the global economy and functions even in times of crisis.

Similarly, the United States has concluded it is dangerously dependent on specific countries for parts of the value chain for semiconductors, critical minerals and materials, batteries, pharmaceuticals, and APIs.

### ***Mutual dependencies amid deep integration***

The EU and the United States are also dependent on each other in sensitive areas, such as supplies of APIs, raw materials, and electric generators. Overall, the EU is less dependent on exports from the United States than vice versa, reflecting the EU's broader base of suppliers. In specific areas, however, EU dependence on the United States is greater than US dependence on the EU. **Charts 2 and 3** identify EU–US mutual dependencies.

### ***Dependencies on China***

Both the EU and the United States have important common dependencies with China, particularly regarding various biomedical-related goods and APIs,

critical materials, and products needed for the green and digital transitions, such as permanent magnets, electric accumulators, cell phones, and radio-broadcast receivers. **Charts 4 and 5** track common EU–US dependencies with China and the rest of the world.

### ***Russia–Ukraine War***

The Russia–Ukraine war has affected global supply chains on all levels. The effects of the pandemic on factory output, warehouse capacity, and container availability had just begun to alleviate somewhat when the Russia–Ukraine war started impacting global supply chains. The war hindered the flow of goods, sparked cost increases and product shortages, and created catastrophic food shortages around the globe.



**Chart 4. EU and U.S. Dependencies on China and the Rest of the World**

	Number of Dependent Products	Potential for Diversification				Share in Total Import Value
		Low	Medium	Medium-High	High	
EU/U.S. Dependencies on China	20 products	61%	9%	9%	21%	EU: 2.8% U.S.: 4.1%
EU/U.S. Dependencies on the Rest of the World	70 products	25%	8%	22%	45%	EU: 4.6% U.S.: 5.1%

European Commission.

**Chart 5. EU and U.S. Mutual Dependencies on China and the Rest of the World: Examples by Sector**

	Health	Critical Materials	Renewables	Digital/ICT
EU/U.S. Dependencies on China	APIs, personal protective equipment	Tungstates, ferroalloys	Permanent magnets	Laptops, cell phones, radios
EU/U.S. Dependencies on the Rest of the World	APIs	Lithium oxide, beryllium	Permanent magnets, types of secondary batteries	Laptops, cell phones, radios

European Commission.

In the early months of the conflict, Ukraine’s agricultural infrastructure and exports via Black Sea ports were impacted by the actions of Russia. In July 2022, however, Russia and Ukraine signed a Turkey–United Nations brokered deal to allow Ukraine to export grain from three ports, while Russia was also able to move fuel, grain, and fertilizer. This deal was extended in November 2022 by 120 days, so it was to continue into March 2023 (<https://news.usni.org/2022/11/18/black-sea-grain-deal-extended-by-another-four-months>).

According to GEP, a global supply chain and operations consulting company, in the first six months of the war, natural gas prices rose by around 120–130% in Europe, while coal prices rose by 95–97% during the same period. Soybean, corn, and crude oil prices have been increasing ever since the conflict began as well, given Russia is a leading producer of these commodities. These price increases have been driven both by Russian supply reductions and EU/NATO-imposed sanctions.

Already struggling with the availability of oil and gas, and the sharp surge in prices due to pandemic disruptions, the EU suffers even more because of the Russia–Ukraine conflict and its heavy reliance on Russia for sources of

energy. The EU depends on Russia for 35% of its natural gas imports, around 20% of its crude oil imports, and 40% of its coal imports.

The port shutdowns also led to a rise in ocean shipping costs. With ships being rerouted causing congestion and delays, this simply worsened the global supply chain situation. Unsurprisingly, trade sanctions and restrictions led to a shift from rail transport to ocean transport, thereby causing even greater pressure and resulting in more container scarcity. This resulted in sharp price increases for many essential goods, like grains, which shot up by around 60% between February and May in 2022. (For more information, see <https://www.gep.com/blog/mind/russia-ukraine-war-logistics-impact>.)

### Using the TTC to enhance supply chain resilience and robustness

The EU and the United States approach supply chain resiliency in similar ways. Both have identified roughly similar sectors of high dependencies, and both emphasize the need to increase domestic capacity in those areas. Each has underscored the importance of transatlantic cooperation, and the need to modernize and strengthen international trade rules.

The TTC is a potentially useful mechanism for the EU and the United States to engage with each other, and with the private sector, to enhance the resiliency and robustness of their respective supply chains, especially in highly vulnerable ecosystems each has identified: semiconductors, pharmaceuticals, critical materials, and clean tech.

### EU actions

Being aware of its strategic dependence on some foreign inputs even before the pandemic, the EU had started to examine ways to increase its autonomy, which has been accelerated by the impact of the coronavirus. To improve supply chain resilience, the EU is pursuing a policy mix that aims to increase domestic capacity, diversify suppliers, and support the multilateral rules-based trade environment. Other like-minded countries are applying a similar policy mix, focusing on supporting reshoring or nearshoring.

Supply chain resilience was very much discussed before the pandemic, in the context of ensuring availability of resources necessary for the twin—green and digital—transitions of the EU’s economy and society. The 2020 Trade Policy Review stated that “strengthening the resilience and sustainability of



the EU economy, and its supply chains is a pillar of the European Union's drive towards open strategic autonomy (OSA)."

In its resolution of November 2020 on a New Industrial Strategy for Europe, the European Parliament called for action to strengthen, shorten, and diversify supply chains in order to make them more sustainable and to reduce overreliance on a limited number of markets, while increasing their resilience. It also asked the Commission for a strategy for smart reshoring to redeploy industries to the EU, increase production and investment, and relocate industrial manufacturing.

In its resolution of July 2021 on trade-related aspects and implications of COVID-19, the European Parliament called for incentives for EU businesses to make their value chains more sustainable and to shorten or adjust their supply chains where it could benefit the EU's economy, resilience, geopolitical objectives, and strategic autonomy. These incentives include State aid.

Similar to the 2020 Trade Policy Review, an October 2021 study for the European Parliament considers supply chain resilience to be one of the main premises on which the EU's drive for autonomy is based. According to the Commission's Directorate-General for Trade, the concept of OSA means that the EU, which has always promoted multilateralism and open trade, will continue to do so wherever possible, while increasing its capacity to act independently.

The European Commission's report on strategic dependencies and capabilities outlined a general approach to addressing the complex problems of supply chain resilience.<sup>11</sup> It says that, by strengthening and diversifying external trade, the EU makes its position in global value chains stronger. This can mitigate possible shocks and disruptions and help ensure that the EU meets its demand for certain goods. Diversification of import sources is also extremely critical. Strong involvement of the EU in multilateral cooperation and coordination mechanisms is also advised, such

as the Group of Twenty (G20) and the WTO, in an effort to monitor and maintain critical supply chains.

The Trade Policy Review and strategic dependencies report discuss how new measures and existing tools fit needs here, such as the EU trade policy tools that help to obtain access to new markets and improve existing access to global markets while increasing resilience. This is done by developing partnerships with like-minded countries. Trade policy has another important role in ensuring EU businesses are able to compete equitably around the world. This can be achieved by better enforcement of existing trade agreements and providing for more effective defense against unfair trade practices. A useful new instrument is the regulation on distortive foreign subsidies, currently under consideration by the co-legislators.

Another option for the EU is to improve resilience of supply by expanding domestic production and strategic stockpiling of important goods. For the former, dedicated industrial alliances at the EU level and the important projects of common European interest (IPCEI) tool offer the opportunity to overcome persisting industrial weaknesses. Currently, IPCEIs exist in the value chains of batteries and microelectronics (including semiconductors, also an object of the recent Alliance on Processors and Semiconductor Technologies, focused on addressing gaps in the production of microchips, and the forthcoming European Chips Act).

A good example of an industrial alliance is the European Raw Materials Alliance (ERMA), launched in October 2020 to address the numerous challenges confronted by raw materials supply chains. The March 2020 Industrial Strategy called for the creation of such industrial alliances and complete industrial ecosystems to achieve the EU's green and digital transitions. An example of a sectoral policy is the 2020 Pharmaceutical Strategy for Europe, which has a dedicated section on enhancing resilience

through diversified and secure supply chains.

The Commission also sees potential in using public procurement to increase resilience. Smart procurement already helps to achieve key EU priorities related to the green and digital transitions, innovation, and social objectives across many industrial ecosystems. By creating demand and supporting strategic sectors, public procurement helps to reduce dependencies and strengthens the resilience of industrial ecosystems and supply chains.

Funding that targets strategic priorities and investment in research can also help to build domestic capacity and boost resilience; the Recovery and Resilience Facility provides a chance to expand this type of funding. In addition, EU research and innovation programs can help to enhance the EU's strategic industrial capabilities: Horizon Europe supports research and innovation in strategic areas where supply shortages persist, such as raw materials, and its key work strands are accelerating the green and digital transitions, and increasing the resilience of industry.

The Commission is also examining the role and specificities of SMEs to determine their possible needs for targeted support to help diversify their supply chains and boost their resilience. The objective is even more challenging because they are particularly vulnerable to lock-in effects and high switching costs. At the same time, due to limited resources, SMEs are often not prepared for supply chain disruption, with lasting negative consequences. Through the European Cluster Collaboration Platform and the Enterprise Europe Network, the EU looks to deal with disruptions and vulnerabilities and help SMEs diversify supply by linking them with new partners. The Commission also plans to help the EU workforce develop skills useful for building domestic capacity. Finally, the EU is moving toward a mandatory system of due diligence for supply chains, to curb human rights and environmental abuses.



According to the Organisation for Economic Co-operation and Development (OECD), companies that implement due diligence are also likely to build more long-term value and resilience.

## Endnotes

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11. The Commission defines strategic dependencies as those "considered of critical importance to the EU and its Member States' strategic interests, such as security, safety, health and the green and digital transformation." Sensitive ecosystems include, in addition, digital, renewable energy, energy-intensive industries, electronics, space and defense, and critical raw materials. □