



# **War in Ukraine: Global update and first view on Supply Chain Impact**

**BCG Global Advantage and Operations Practice Areas**

Prepared: 10 March 2022 – Confidential: Limited Distribution

# Introduction to this document

## The war in Ukraine is above all a political and humanitarian crisis...

Russia's invasion of Ukraine has led to a serious **humanitarian crisis**. BCG condemns this attack and the violence that is killing, wounding, and displacing so many people.

The top priority in moments like these must be the **safety and security of people**. Corporates, governments, and non-for-profit organizations should focus on supporting the people in Ukraine, Russia, Europe, and globally affected (physically and mentally).

## ... but it is driving disruption across global supply chains

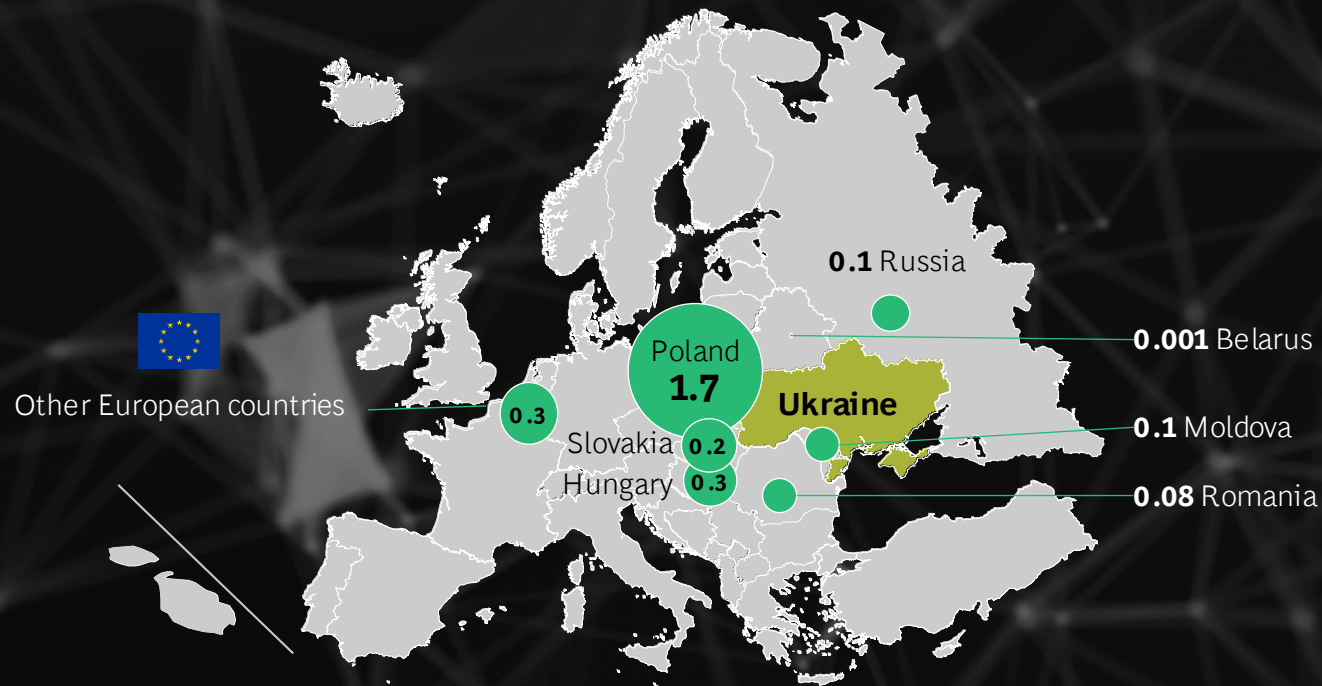
It is the duty of political, societal, and business leaders to navigate through this crisis. **The intent of this document is to inform discussions and decisions on the global economic impact as well as the supply chain and procurement impact of the war in Ukraine.**

The situation surrounding Ukraine is dynamic and rapidly evolving - this document reflects information and analysis as of **10 March 2022**. It is not intended as a prediction of future events and is shared only as a resource for BCG and client conversations.

# Summary snapshot | Largest refugee crisis in Europe since 1945

## 2.8+ Million Refugees on the move

Ukrainian Refugees by Destination Country (M)



## Significant impact across Europe and beyond

All 27 EU countries offering 'temporary protection' to UA nationals, including healthcare, accommodation and temporary work permits

Polish Government estimating refugee support costs could reach \$1.7B

Huge medium-term challenge for Europe to absorb, house, educate, skill and employ numbers on such a scale

EU providing financial support to non-members to aid with refugee costs (e.g., Moldova)

Countries further afield (e.g., Canada) offering fast-track entry terms to Ukrainians



# Summary snapshot | War in Ukraine global economic impact

## Global Growth Outlook

### GDP Forecasts<sup>1</sup>

	2021	World Bank 2022	Leading FIs 2022	
	Actual	Jan'22 Forecast	March '22 Forecasts	
			Median	Minimum
Russia	4.7%	2.4%	-4.4%	-10.4%
Euro Zone	5.3%	4.2%	3.3%	2.2%
Global	3.9%	4.1%	4.5%	3.4%

## Commodity Prices<sup>4</sup>

Commodity price (actual, \$)

Commodity	Jan 3 '22	Mar 7 '22	Change
Crude Oil (\$/bbl)	79.0	123.2	+56%
Gas (\$/MWh)	80.4	227.2	+183%
Coal (\$/t)	157.5	422.7	+168%
Wheat (€/bu)	240.0	396.5	+65%
Rapeseed (€/t)	728.5	845.0	+16%
Nickel (\$/t)	20,430.0	39,905.0	+95%
Palladium (\$/oz)	1,826.0	2,899.9	+59%

## Supply Chain Metrics

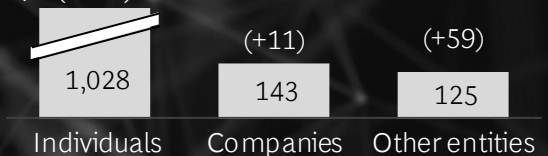
Deep Sea Cargo Bosphorus Straits Transits (Avg. #/day) <sup>2</sup>					Deep Sea Cargo Port Calls (Avg. #/day) <sup>2</sup>					Baltic Dry Index (Daily Avg) <sup>3</sup>				
	Pre-War (Nov '21)	Prev. Wk (2/23-3/1)	Curr. Wk (3/2-8)	ΔCW-PW		Pre-War (Nov '21)	Prev. Wk (2/23-3/1)	Curr. Wk (3/2-8)	ΔCW-PW		Pre-War (Nov '21)	Prev. Wk (2/24-3/2)	Curr. Wk (3/3-9)	ΔCW-PW
Northbound	8.9	4.4	5.1	-11%	Ukraine	4.5	0.6	0.1	-75%	BDI <sup>3</sup>	2780	2101	2229	6%
Southbound	9.6	9.7	5.9	-33%	Russia	21.7	22.7	19.3	-15%					

## Sanctions & Policy Actions

### Updates since 3 March

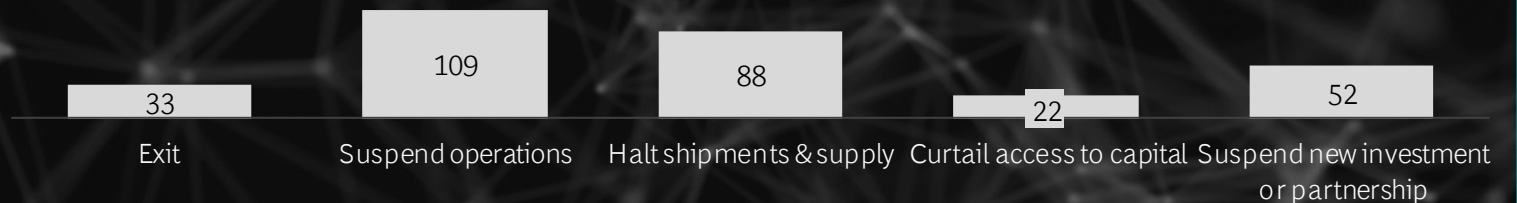
- US bans Russian O&G imports, immediately
- EU to reduce Russia gas imports by 2/3 by end 2022
- UK to eliminate Russia oil product imports by end 2022
- Russia to restrict certain exports of Critical Materials
- Russia to seize assets of certain firms exiting Russia

### Cumulative # of WW Sanctions in-place<sup>5</sup> (Δ since 3 March)



## Corporate Actions in Russia Market

Based on sample of ~300 companies<sup>6</sup>



1. GDP forecasts from World Bank and FIs per Bloomberg database (7-21 FIs per forecast period) 2. Deep Sea Cargo: oil tankers MR & up, bulk carriers Panamax & up, container ships 3,000+ TEU, VLGCs, LNG carriers 60,000+ cbm & PCTCs 6,000+ ceu Clarkson Research (<https://www.clarksons.com/>) Clarkson Research Services Limited ("Clarkson Research"). © Clarkson Research 2021. All rights in and to Clarkson Research services, information and data ("Information") are reserved to and owned by Clarkson Research. Clarkson Research, its group companies and licensors accept no liability for any errors or omissions in any Information or for any loss or damage howsoever arising. No party may rely on any Information contained in this communication. Please also see the disclaimer at <https://www.clarksons.net/Portal/disclaimer>, which also applies. No further distribution of any Information is permitted without Clarkson Research's prior written consent. Clarkson Research does not promote, sponsor or endorse the content of this communication. 3. <https://www.bloomberg.com/quote/BDIY:IND>; Baltic Dry Index (BDI) is index of avg price paid for transport of dry bulk mat's across 20+ routes 4. S&P Capital IQ 5. Total sanctioned actions, incl. duplication. Source: [corrective.org](https://www.corrective.org) 6. Yale Chief Exec Leadership Inst.


# Key Sanctions & Policy Actions currently in-place

## Current Sanctions & Policy Actions (Key examples)






### "Western" Allies

-  • Co-ordinated policy/sanctions programs
  - Vs. Russian entities and individuals
  - Limiting Russia's access to Financial System
    - E.g., denial of access to SWIFT
  - Technology Export Controls
-  • US/UK/EU: Limiting purchases of Russian energy exports
-  • EU/Canada/US: Close airspace to Russian aircraft
-  • Canada: Drop Russia from WTO "Most Favored Nation" status
- 
- 

### Russia

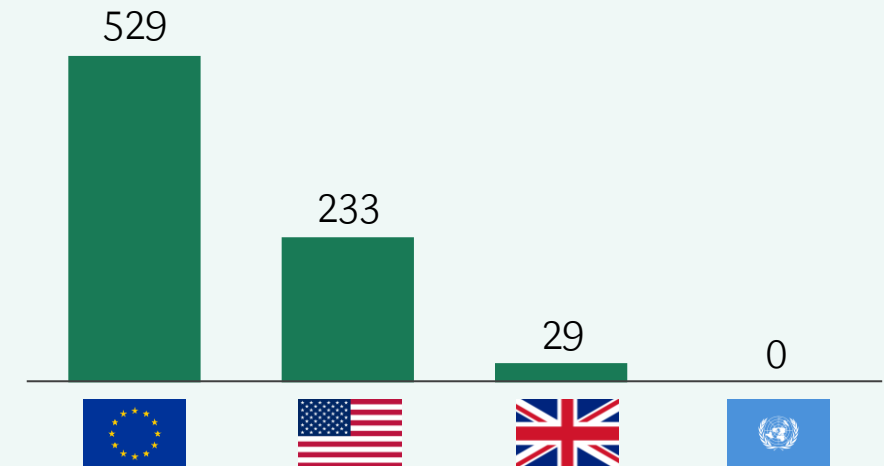
-  • Plan to limit exports of critical materials to certain countries (Details pending)
- Declared intent to seize assets of firms exiting Russia

### Large EMs

-  • So far, no sanctions imposed by this group of countries
-  • Have asked for hostilities to cease
-  • China and India abstain at UN Security Council vote
-  • China official statements focus on peacemaking and mediation
-  • Indonesia in difficult position, as 2022 G20 host

## Current Sanction Actions by country and target

### Sanction Actions<sup>1</sup> in-place



### Sanction Targets<sup>1</sup> / Δ since last week



# Corporate Actions

## Company Announcements re: Russia Market per Yale School of Management tracking (as of 9 March 2022)

# Companies	Exit	Suspend Operations	Halt shipments/ supply	Curtail access to capital	Suspend new investment or partnership
	33	109	88	22	52
Examples	<b>BP</b> Announced plans to divest its 19.75% stake in Russian energy company Rosneft	<b>Bombardier</b> Suspended all activities/technical assistance with Russia	<b>Rolls Royce</b> Suspended all shipments to Russia	<b>JP Morgan</b> Curtailed Russian access to capital markets	<b>Yum Brands</b> Suspended new investments in Russia
	<b>Eni</b> Communicated plans to exit Blue Stream pipeline JV with Russia Gazprom	<b>Apple</b> Stopped selling products and online transactions in Russia	<b>Maersk</b> Stopped shipping to/from Russia (exclude essential supplies)	<b>Black Rock</b> Restricted Russian access to capital markets	<b>Kraft Heinz</b> Suspended new investments, imports and exports
	<b>Goldman Sachs</b> Said it would close operations in Russia	<b>PepsiCo</b> Suspend operations (except essentials)	<b>Boeing &amp; Airbus</b> Halted supply of aircraft parts to Russian airlines	<b>Credit Suisse</b> Limited Russian access to capital markets	<b>Nestle</b> Discontinued all new capital investments in Russia

Definitions: Exit (Cease operations, divestment, discontinue, leave and withdraw business from Russia). Suspend Operations (Suspend activities, JV, sale points, manufacture in Russia). Halt Shipments/Supply (Temporarily stop / freeze sales and transportation of goods/ services in, to and from Russia). Curtail access to capital (Financial Institutions (FI) restrict, reduce, cut, suspend, Russian access to capital provided by financial institutions). Suspend New Investments or Partnerships (Stop any new investments in Russia and suspend current sponsorships for Russian Athletes).

As of March 10th, ~300 companies have announced a complete or partial withdrawal from Russia, based on news & press search

Source: Yale School of Management; Press search; BCG analysis

# Key immediate impacts of the war on companies



## Supply chain disruption

Russia and Ukraine are key exporters for **agriculture, metals, energy**

**EU more exposed** than US, and has more leverage in trade sanctions

Crisis creates **key choke points across supply chain**

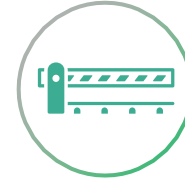
*Deep-dive in this document<sup>1</sup>*



## Commodity price volatility

Clear **price spike in gas** and agricultural commodities

Crisis **exacerbates already high energy prices** and volatility



## Sanctions & Doing Business risks

US, UK, EU, Canada take **strong stance**

Large Emerging Markets take more nuanced approach

Sanctions will also have **2<sup>nd</sup>/3<sup>rd</sup> order impacts**

**Financial Services** is the most affected sector

Russia is also applying **counter measures** (e.g., restriction on liquidations)



## Sales & Service risk

**Sales in Russia** will be challenging or even prohibited by Western Sanctions

**Global consumer brands** will be affected by sales, service and reputational risk in Russia

**Import streams for industrial goods** will be impacted

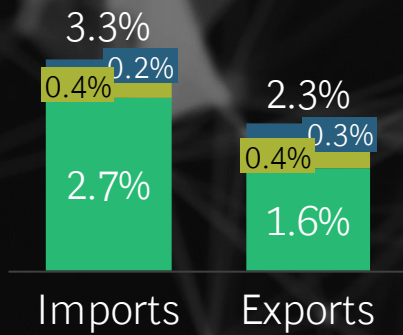
<sup>1</sup> Energy (e.g., Oil & Gas) implications will be covered in a separate paper next week  
Note: BCG does not provide legal advice; Source: BCG experience and analysis



# Russia, Ukraine and Belarus make up a small percentage of global trade but have an over indexed share of trade in Europe specifically

## World

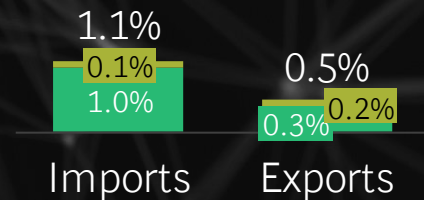
% of global trade



X Axis

## US

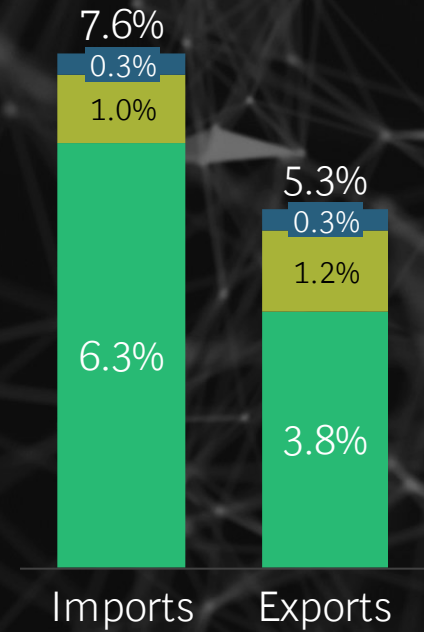
% of US trade US



X Axis

## Europe

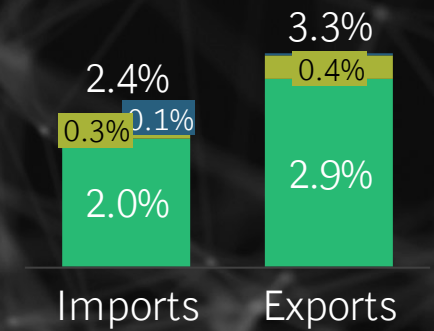
% of EU trade



X Axis

## China

% of China trade



X Axis

Legend: Russia (red), Ukraine (blue), Belarus (green)



# Overview: Several major sectors impacted, with many supply chains at risk

Before war in Ukraine, global supply chains were under stress from COVID and geo-political events (e.g., Brexit, tariffs, etc.)

## Supply and cost impacts (p.10-12)

### Commodity shortages

Difficulty sourcing and/or higher prices for key commodities

### Component/product sourcing challenges

Inability to source manufactured goods and inputs due to plant closure

### Demand shocks

Slowdown in manufacturing / inability to import impacting exporters

### Logistics

Rise of logistics costs due to capacity and fuel impact

## Supply chains at risk (p.13-16)

Supply Chains impact varies across sectors. A few examples emerge:

- **Steel:** Supply risks in Europe due to disruptions of intermediate and finished steel products (e.g., pig iron, slabs)
- **Semiconductors:** Short supply especially of advanced chips exacerbated – main impact auto, industrial, electronics
- **Automotive:** Disruption of raw materials and component inputs – accelerate inventory shortages and rising global prices
- **Agribusiness:** Shortages (e.g. wheat, fertilizer) and increased transport costs likely to drive up commodity and food-goods prices

## Implications for leaders (p.17-18)

**Short-term:** Understand risks & impact, prioritize customers to protect; find alternative sources, rebalance global network

**Mid-to-long term:** Build in resilience & anticipate areas of exposure, elevate supply chain risk to C-suite, optimize global footprint, dual source, re-set supply chain buffers



# Raw Materials Steel, Auto and Agribusiness most impacted due to current or potential unavailability of supply from Russia and Ukraine

## Raw mat'ls with high Russia, Ukraine, Belarus share<sup>1</sup>

## Top export markets

## Industries primarily impacted

## Sanctions as of 10 March 2022<sup>4</sup>

		% of global exports																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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☆ Deep dive to follow


Note: Trade data from 2019; Based on HS6 level except for Nickel at HS4 level (7501,7502) Filtered for products w/export value >\$1B; Where no value for BY or UA; <1% of global exports 1. Analysis based on HS6 codes: 270111, 720110, 284420, 720711, 711021, 310520, 750210, 760110, 310420, 271121, 100199; 2. And its compounds 3. Mineral or chemical fertilizers containing nitrogen, phosphorous, potassium; Russia indicated they might halt exports; 4. Excludes impact of indirect sanctions i.e., on financing, transport, and sanctions on individuals 5. Hs4 level data (7501,7502) 6. Titanium on HS4 level (8108), OEC data 7. In gaseous state Source: USGS, FAO, UN Comtrade, EIA, OEC World, BCG Analysis, Web search


# Component sourcing & demand shocks

## Supply and demand ripple effects created by companies stopping or limiting Russian & Ukrainian operations

Companies across industries stopping or limiting operations for component shortages or to protect personnel...


### Auto

 **Foreign OEMs (e.g., Hyundai<sup>1</sup>, VW<sup>2</sup>, Ford<sup>3</sup>)** halting car production, import/ export and servicing in Russian operations


 **Leoni AG<sup>4</sup>, Kromberg & Schubert<sup>5</sup>** and other global tier 1 & 2 suppliers closed Ukrainian plants (manufacturing in wire harnesses)


### Food and beverages

 **Consumer goods companies (e.g., Heineken<sup>6</sup>, Carlsberg<sup>7</sup>, Unilever<sup>8</sup>, Pernod Ricard<sup>9</sup>)** suspended exports to Russia and/or Russian production

 **Consumer goods companies (e.g., AB InBev<sup>10</sup>, Coca-Cola<sup>11</sup>)** shutdown beverage production in Ukraine

### Chemicals/ Pharma

 **BASF<sup>12</sup>** halted investment in new business and operations in Russia, except for production related to humanitarian efforts

 **Biosphere<sup>13</sup>** cut production of personal care products & biodegradable plastics in Ukraine

### Aerospace

 **Airbus<sup>14</sup>** suspended support services & supply of spare parts to Russian airlines; **Boeing<sup>15</sup>** stopped procuring titanium from Russia

 **Boeing<sup>15</sup>** temporarily closed Kyiv office employing ~1000 engineers

...with two main effects for global supply chains

1

**Negative demand shock** on manufacturing inputs exported to Russia/Ukraine. Will cause **lost sales** for some suppliers and create sourcing opportunities for manufacturers outside of Russia/Ukraine

2

**Lack of supply** of key components and products for companies importing from Russia/Ukraine, impacting those importers' ability to satisfy their customers' demand

1. [KBS World](#) (03/09) 2. [WSJ](#) (03/03) 3. [Reuters](#) (03/01) 4. [WSJ](#) (02/27) 5. [Reuters](#) (03/03) 6. [NL Times](#) (03/05) 7. [Reuters](#) (03/04) 8. [Reuters](#) (03/08) 9. [The Times](#) (03/07) 10. [Fortune](#) 11. [Reuters](#) (02/24) 12. [Nasdaq](#) (03/03) "Effective immediately, BASF will only conduct business in Russia and Belarus that fulfils existing obligations in accordance with applicable laws, regulations and international rules.", 13. [Forbes](#) (03/06) 14. [BBC](#) (03/02) 15. [Reuters](#) (03/07) Source: Press, web search, company announcements, BCG Analysis



# Logistics Global freight routes further distressed leading to reduced capacity and increased costs across industries



## AIR FREIGHT: Rates approaching record highs (120% above pre-COVID)<sup>1</sup>

Flight bans and sanctions to cause **capacity loss** in EU-Asia lane (21% of cargo) exacerbating capacity crunch. Portion will cancel vs re-route

Super-connector airlines in the **Middle East** may serve as a substitute<sup>1</sup>

**Jet fuel prices up 27%** month over month<sup>1</sup>, likely to drive cargo rates up further



## SEA FREIGHT: Moderate impact on capacity, significant risk from fuel

**Congestion expected at northern EU ports** to process 200 rerouted ships waiting to cross the Kerch Strait<sup>2</sup>

**Maersk, ONE, MSC, Hapag-Lloyd** have suspended shipments to Russia & Ukraine<sup>2</sup>

**Bunker (marine fuel) up 84%** vs. last year<sup>3</sup>, bunker is ~45% of vessel op costs; however, rates currently detached from container rates



## ROAD & RAIL: China-EU railroad stopped & EU truck drivers shortages heightened

**Disrupted China-EU railway** - linking 24 countries & 264 cities, and intended alternative to global sea and air freight<sup>4</sup>

**Rail lines through Russia closed:** Asian exporters need to find new routes to EU<sup>5</sup>

**Ukrainian truck drivers** returning to the Ukraine exacerbating EU driver shortage (e.g., 30%+ drivers in Poland from Ukraine<sup>6</sup>)

**Over-the-road trucking costs** rising from fuel

1. IATA: Europe-Asia, Asia-North America most heavily hit by airspace closure, Based on CTKs (cargo ton kilometers) over the past 12 months; 2. Business Insider: Russia's War on Ukraine Could Triple Ocean Shipping Rates Say Experts, 3. Freightwaves: Ship fuel spikes to historic \$1,000/ton mark as war fallout worsens, 4 South China Morning Post: China-Europe rail trade set for infrastructure upgrade, with container traffic up 30 per cent, 5. CSCMP's Supply Chain Quarterly: Logistics pros warn of business impact from Russia-Ukraine war, 6. Fortune: Russia invasion: Ukrainian emigrants leaving safety and heading to war Source: Web search; BCG analysis



# Steel Supply risks – especially among European re-rollers – due to disruption of intermediate and finished steel products

## Risk Summary

Access to commodities

Cost for commodities

Demand Shocks

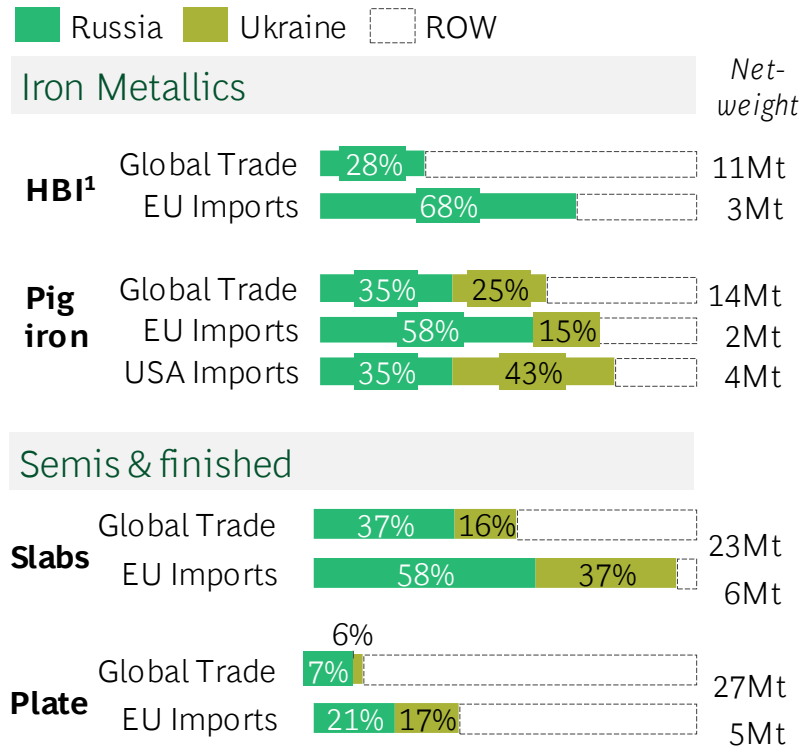
Access to mfg components



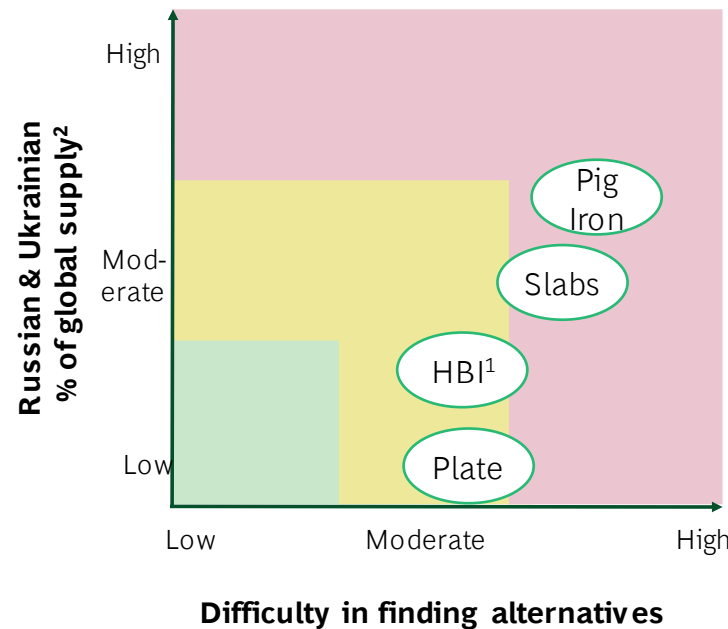
N/A

N/A

## Russia & Ukraine supply much of world's intermediate / finished steel products



## Producers & industrial goods sector in Europe / US likely impacted



Russia is lowest cost producer globally - **likely to divert its exports to Asia**

**EU re-rollers will be particularly impacted by supply shortage** due to slab reliance

**US producers using Electric Arc Furnaces impacted by shortage of metallics** (HBI¹, pig iron) used in high-quality production

**Wind turbine towers and pipe/tube for oil & gas** are examples with cost & lead time impact

Already **record high steel prices** (scrap, met coal, power) and could further rise due to crisis

1. Hot Briquetted Iron, has production benefits when used in Electric Arc Furnace (EAF) 2. Estimated using extra-regional trade as a proxy  
Note: Trade data from 2020; Based on HS6 level Source: UN Comtrade, BCG Analysis, Web search

# Semiconductors Already short global supply further exacerbated by raw material shortages will continue to impact auto and consumer electronics

## Risk Summary

Access to commodities



Cost for commodities



Demand Shocks

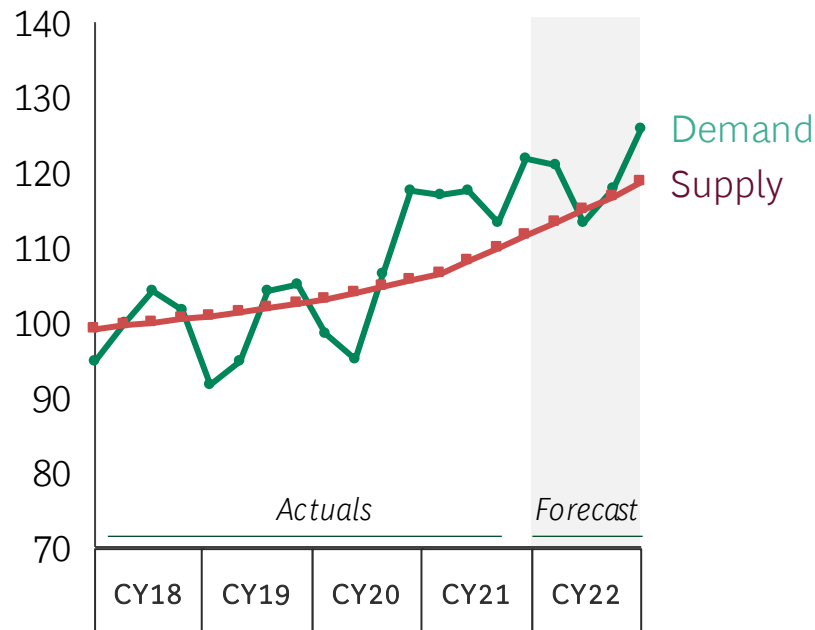
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Access to mfg components

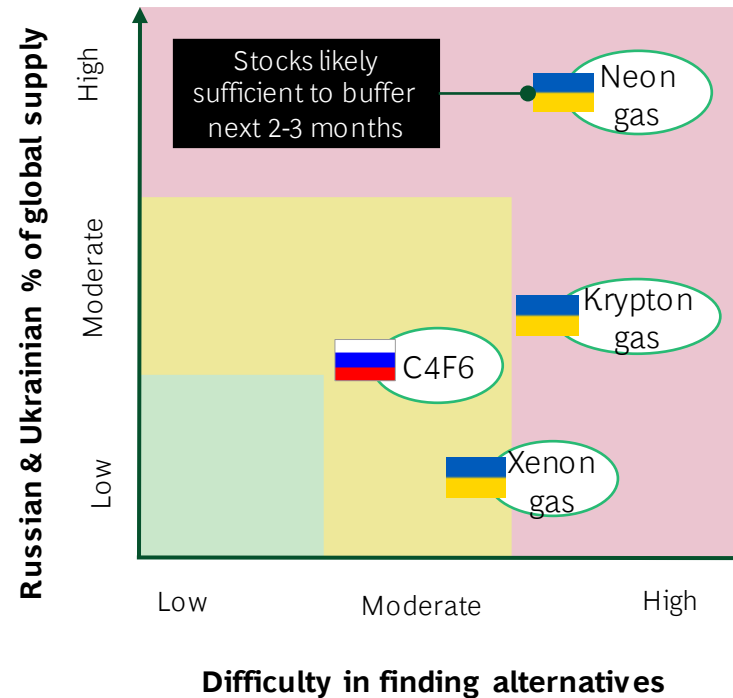
N/A

## Large demand-supply imbalance already before the Ukraine crisis

Demand<sup>1</sup> and supply<sup>2</sup> for semiconductors (pre-Ukraine crisis view<sup>3</sup>); Index base = Quarterly 2018 average



## Once existing stocks of required gases are depleted, a continued shortage of semiconductors expected until alternate suppliers found



Gases are **critical consumable for semiconductor production** – e.g., Neon required for manufacturing of advanced chips

If crisis continues, lower gas availability (especially Neon) could **further deepen chip shortage** and thereby reduce availability

Sectors using advanced chips (e.g., **cell phones, computers, etc.**) impacted most

**Auto, industrial** and other sectors also impacted, as shortage on gases reduce semiconductor production yields

**Situation likely transient**, as new gas production scheduled to be available over next 6-12 months (in Germany, Singapore, Japan)

1. Historical and projected sales; forecasts derived from projected demand evolution of selected end-industries. 2. Historical and projected production; 3. BCG IC Model Forecast  
Note: Drop in semiconductor demand due to sanctions will not provide a meaningful demand reduction, as Russia represent a small share of global semiconductor demand  
Source: BCG IC Model Forecast, BCG analysis, Factiva, Expert inputs

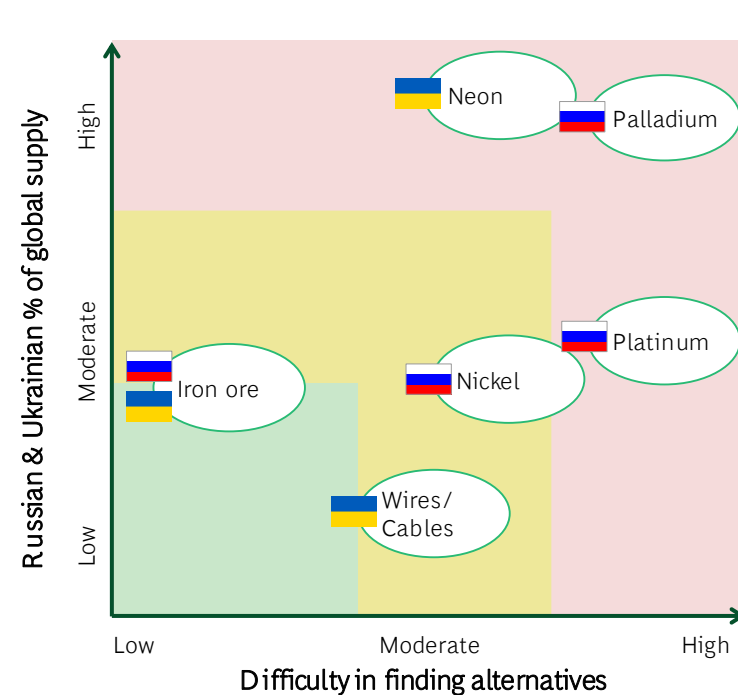


# Auto Challenges in sourcing multiple impacted components in near-term, creating risk of exacerbating existing supply shortfalls

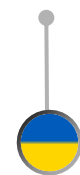
## Risk Summary



## Risks to key inputs with limited alternatives already impacting vehicle manufacturing...



### Selected examples



Manufacturers of **wire harnesses and other auto parts** (Leoni,<sup>1</sup> Sumitomo<sup>2</sup> etc.) closed plants



OEMs have **halted car production** despite large capacity



### Effect

**German and Korean OEMs<sup>3</sup>** have stopped production due to lack of cables

With only **5% of local production exported**, impact will be local & limited

## ... with other challenges that have potential to reduce output

**Rising palladium & platinum prices:** limit OEM production of ICE cars (due to catalytic converter application) meeting ESG regulations, potential to stimulate EV adoption

**Transient impact from neon disruption:** Microchip manufacturers securing new supplies; gas producers installing new plants

**Shortages of wires/cables likely transient:** Companies rerouting production/supply from tier 1 & 2 suppliers in Ukraine

Nickel shortages will **increase cost of EV batteries** in the short-term, but impact unlikely to be long-term as newly developed Nickel-free batteries will help mitigate the shortage risk

Note: Ukraine also producer of other auto parts such as seat covers, injections molding parts, but contribution to global production negligible. CIS : Commonwealth of Independent States; % of global supply in MT for raw materials and in M\$ for Wires/cables; Low: < 5%, Moderate: 5-10%, High: >25%, Moderate 1. WSJ (02/27) 2. Barrons 3. IHS Markit  
Source: S&P Capital IQ, ITC TradeMap, HIS Markit, Automotive News, EPS News, BCG analysis

# Agribusiness Constrained supply of fertilizer will impact crop productions and increase prices for a variety of food goods

## Risk Summary

Access to commodities



Cost for commodities



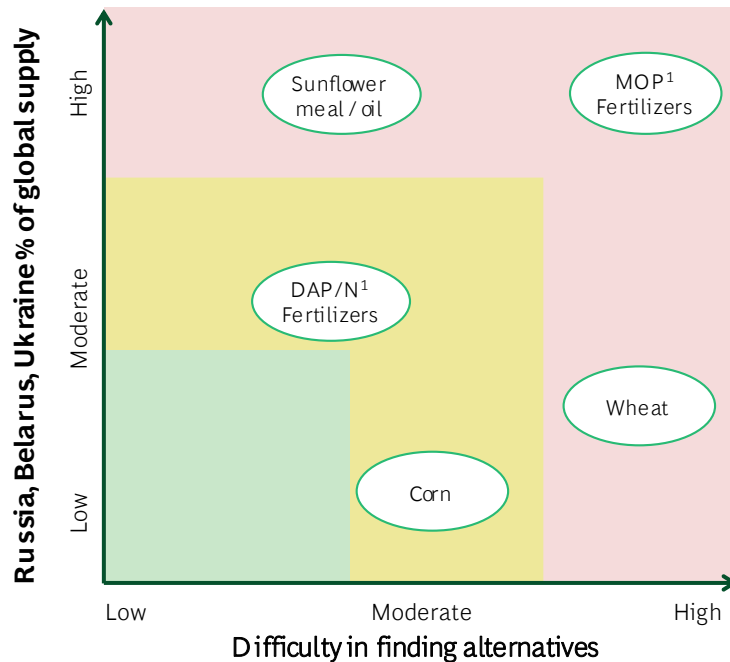
Demand Shocks



Access to mfg components



## Supply constraints will lead to higher industry costs and shortages



**Crop production will decrease through '23** from Ukraine supply loss & fertilizer supply constraints

**Higher animal product prices through '23** due to higher feed cost

Most **food goods to see higher prices as supply tightens** adding to already high food inflation

**Unclear impact on agriculture inputs** (machinery and equipment)

**Food insecurity to increase** especially in Global South, Middle East, & North Africa

**Will exacerbate existing supply issues** incl. the South American drought & shipping congestion

## Price rise of wider commodities due to second-order impact

Price Mar 9, 2022 vs EOY 2021<sup>2</sup>

**Soybeans +27%** Primarily animal feed that substitutes for sunflower meal

**Milk +22%** Animal products already impacted by higher feed cost

**Palm Oil +48%** Cooking/frying oil impacted by reduced sunflower oil supply

**Rice +6%** Grain impacted by high fertilizer cost & reduced grain supply

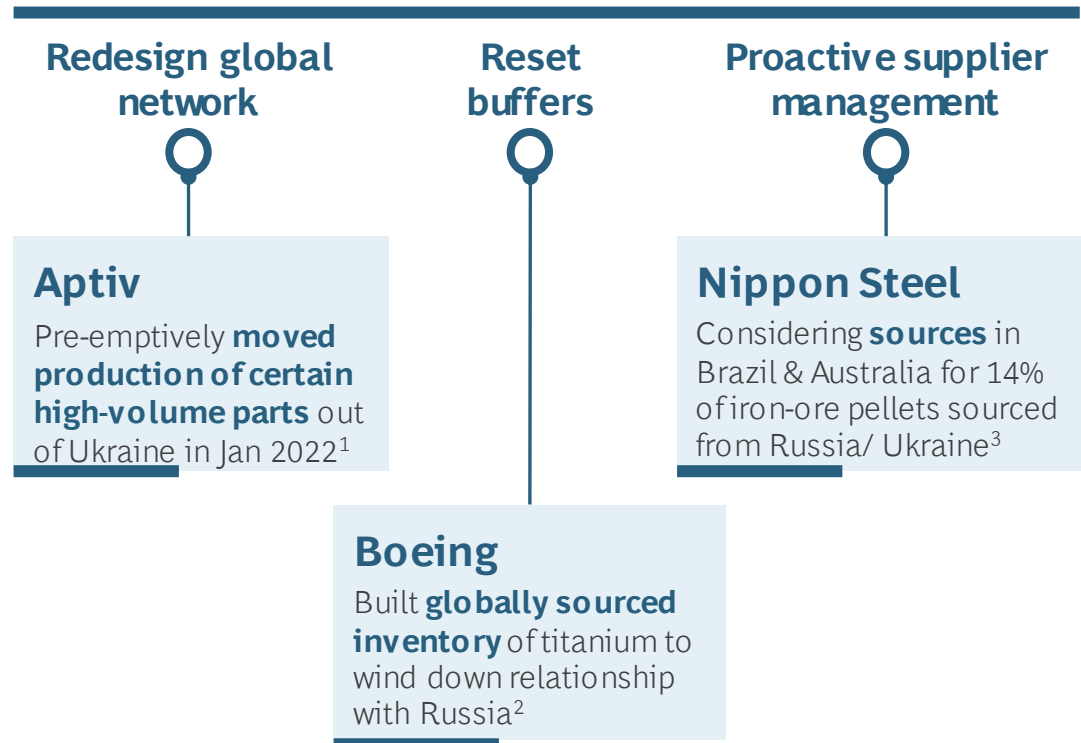
1. MOP = Muriate of Potassium, DAP = Diammonium Phosphate, N = Nitrogen 2. Business Insider Commodities Tracker; end of day March 9, 2022  
Source: Bloomberg, New York Times, Barclays Equity Research, ING Economic and Financial Analysis, Financial Times, Middle Eastern Eye, BCG analysis



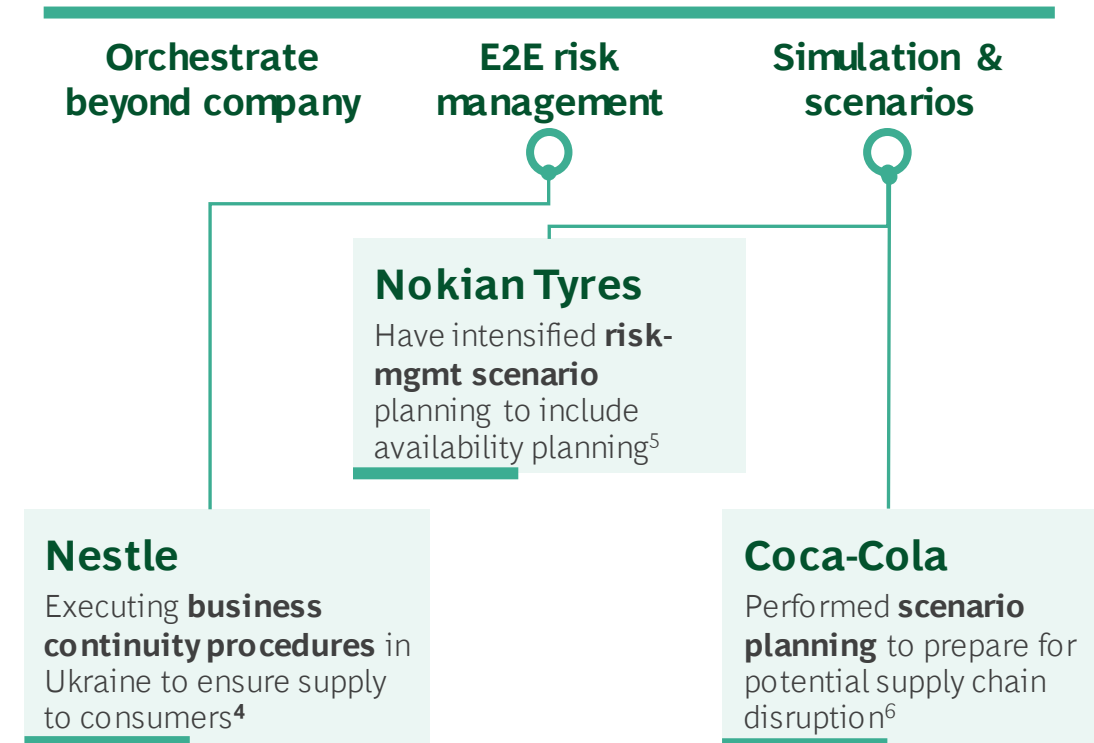
# Companies taking immediate, short-term actions to mitigate rapidly evolving supply chain risks...

## How companies are responding today

### RECONFIGURE SUPPLY CHAIN



### RESPOND RAPIDLY TO DISRUPTION

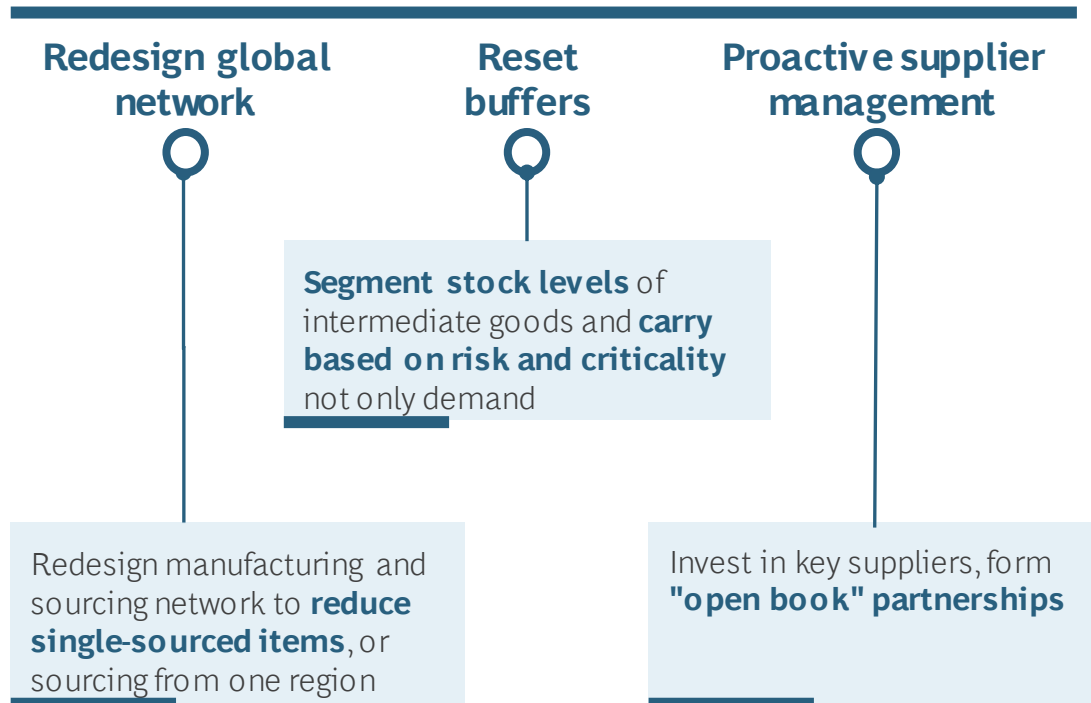


1. Reuters: Auto parts maker Aptiv recently shifted high-volume Ukraine-CEO 2. Simple Flying: Boeing Isn't Worried About A Lack Of Russian Titanium 3. Mining Technology: Russia-Ukraine crisis hits ArcelorMittal and Nippon Steel 4. Reuters: Nestle says operations running normally in Ukraine, continuity plans in place 5. Reuters: Nokian Tyres moves some production and stock out of Russia 6. Reuters: London-listed Coca-Cola HBC readies Russia contingencies as profits rise Source: Web search; BCG analysis

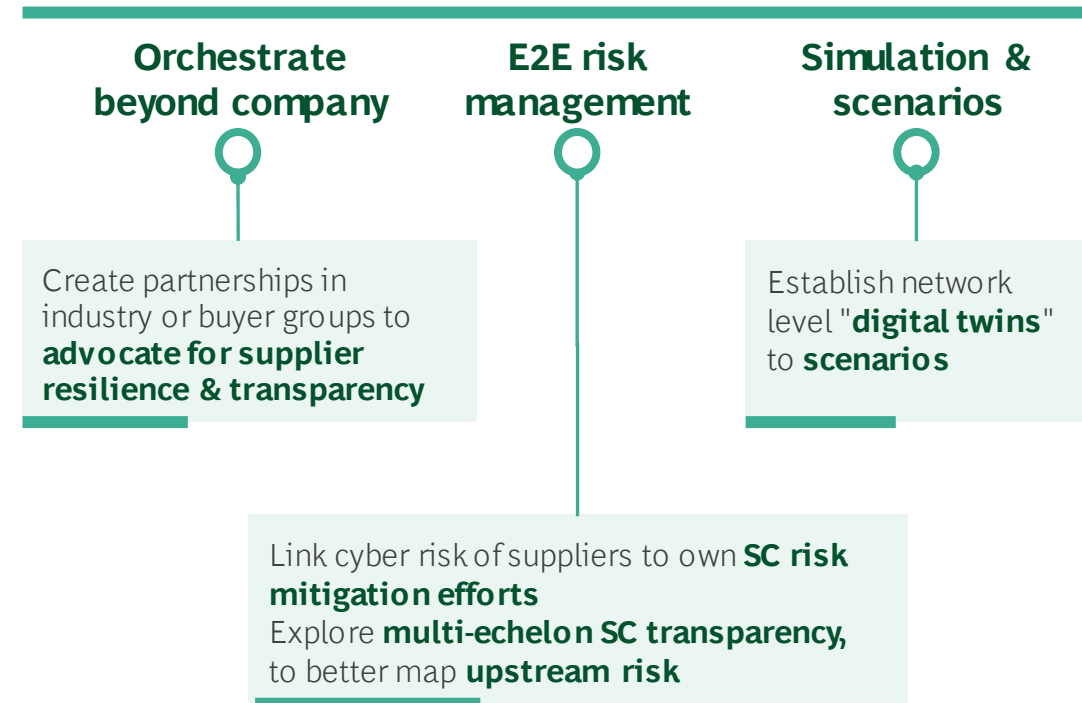
# ... and should build capabilities over the medium and long-term to build resilience for future disruptions

## How companies can build supply chain resilience in the medium to long term

### RECONFIGURE SUPPLY CHAIN



### RESPOND RAPIDLY TO DISRUPTION



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